PROGRESSIVE SCHOOL SERIES.

COMMON SCHOOL ARITHMETIC

(In Three Parts).

BY

W. T. KENNEDY,

PRINCIPAL OF COUNTY ACADEMY, HALIFAX.

AND

PETER O'HEARN,

PRINCIPAL OF ST. PATRICK'S BOYS' H[illegible] SCHOOL, HALIFAX.

Prescribed for use in the Public Schools in Nova Scotia and New Brunswick.

"Long is the road by rules, short and easy by examples."

SENECA.

PART ONE.

PUBLISHERS:

GEORGE A. KNODELL, ST. JOHN, NEW BRUNSWICK

T. C. ALLEN & CO., HALIFAX, NOVA SCOTIA.

Entered according to Act of the Parliament of Canada in the year 189
by T. C. Allen & Co. in the Department of Agriculture.
(Copyright Branch).

PREFACE.

In teaching Arithmetic, as in teaching anything else, some knowledge on the part of the individual taught and some ability to learn may be presupposed. The mistake often made by teachers is that they do not properly gauge the one or the other. As every pupil differs from his fellows in both respects, the teacher must, so to speak, strike an average, when framing an exercise for the simultaneous development of several. In this book this fact has been kept in view. Though the exercises are not arranged specially for either the graded or the miscellaneous school, or any particular conditions, yet it is hoped they will be found well adapted to any school and even to the private pupil.

Every new principle in Arithmetic should be introduced by an oral lesson, and oral lessons should be continued until the principle is mastered. The best oral lessons are those given by the teacher, and should refer to objects and transactions familiar to the pupil. The "Committee of Ten," appointed by the National Educational Association of the United States, in 1892, say, "The simple operations of Arithmetic can be better exemplified by problems set on the spur of the moment and springing naturally from the environment of teacher and pupil, than by those given in a text-book; and have the inestimable advantage of exciting the interest of the pupil."

Those given in this book are merely suggestive. They must be followed by many others.

It is of the utmost importance that pupils be trained to obtain correct answers without a second trial. Every "mistake" in the use of the fundamental rules is so much development of carelessness, and will afterwards cause much unnecessary labor to both pupil and teacher. The exercises in the lower grades should be so simple, at first, that there would be no possible excuse for a mistake. By gradually introducing more difficult ones, absolute accuracy in lengthy processes may be secured. This accuracy should be exacted in both mental and written work.

Frequent review is also necessary in order that principles and processes may make a lasting impression.

The compilers wish to acknowledge their indebtedness to Prof. A. G. Macdonald, of the Normal School, Truro; to Prof. James Little, of the Colchester County Academy, and especially to the Superintendent of Education and to Supervisor McKay, of Halifax, for assistance in revising the manuscript, and for many valuable suggestions during the progress of the work.

CONTENTS.

Introductory Oral Lesson, - - - - - - - - - 7
Notation and Numeration, - - - - - - - 8, 15
Addition, - - - - - - - - - - - - - - 10
Concrete and Abstract Number, - - - - - - - 12
Analysis of Numbers, - - - - - - - 13, 14
Equal Increments, - - - - - - - - - 19
Multiplication, - - - - - - - - - - - - 28
Continued Product, - - - - - - - - - 34
Factors, - - - - - - - - - - - - 34
Division, - - - - - - - - - - - - - 53
Long Division, - - - - - - - - - - 61
Signs and Brackets, - - - - - - - - - 66
Averages, - - - - - - - - - - - - 69
Roman Notation, - - - - - - - - - - 70
Canadian Money, - - - - - - - - - - 71
Addition, - - - - - - - - - - - 72
Multiplication, - - - - - - - - - 73
Subtraction, - - - - - - - - - - 74
Division, - - - - - - - - - - - 75
Bills of Goods, - - - - - - - - - - 78
Unitary Method - - - - - - - - - - 81

ARITHMETIC.

1. The teacher should begin each part of the subject with an oral lesson and should use freely such objects as pencils, pens, marbles, cents, splints, etc., as well as a foot rule, a yard stick, a meter stick and their convenient subdivisions. Common weights and measures, such as the ounce, pound, pint, quart, grain, gram, liter, should also be found in every class-room where Arithmetic of an elementary character is taught.

2. The following will serve as a sample lesson for beginners:

What do I hold in my hand? Pencils. How many? 8. Now let 4 boys come up. I wish to divide the 8 pencils among the 4 boys. How many shall I give each? Try 3. The first boy gets 3 and the second boy 3 and I have how many left? Only 2. Then I must get all the pencils back and try again. Shall I try this time to give each boy more or less than 3? Less. Try 2. Very well, I give each boy 2 and I have none left. How many boys now have 2 each? 4. How many pencils had I? 8. How many 2's are in 8? 4. When 8 is divided into 4 equal parts how many are in each part? 2.

Now let us collect the pencils. I get 2 from the first boy, 2 from the second, 2 from the third and 2 from the fourth. How many times did I get 2? 4 times. When I get 2 four times how many do I get? 8. Then 4 times 2 are—? 8.

We will give out the pencils again. Let the first boy take 2. How many are left? 6. [The teacher holds them so that the children can count if necessary.] When 2 is taken from 8 how many are left? 6. Let the second boy take 2. How many have I now? 4. Then 2 from 6 leaves—? 4. Let the third boy take 2. What number

remains in my hand? 2. Then 2 from 4 leaves—? 2. When the fourth boy takes 2 there are none left. 2 from 8? 6. 2 from 6? 4. 2 from 4? 2. 2 from 2? 0.

Now let us get the pencils collected again. Let the first boy place his 2 pencils on the desk. Now I take 2 pencils from the second boy and I *add* them to those on the desk. How many are on the desk now? 4. When 2 and 2 are added what number do they give? 4. Now let the third boy put his 2 pencils on the desk. How many are now on the desk? 6. Then 2 added to 4 make—? 6. The fourth boy now puts his pencils on the desk, and I wish to know how many are there now? 8. When we add 2 and 2 and 2 and 2 how many do we have? 8. Yes, the sum of 2 and 2 and 2 and 2 is 8.

3. The numbers we have been using in talking about pencils can be written either in words or in figures. Indeed, we can write all numbers by means of the following figures:

Figures:	Words:	Figures:	Words:
0	nought.	5	five.
1	one.	6	six.
2	two.	7	seven.
3	three.	8	eight.
4	four.	9	nine.

4. The figures are often called *digits*.

5. When we wish to write in figures a number larger than 9 we use two figures. Ten is written 10, that is 1 *ten* and no *ones*. Fifteen is written 15, that is 1 *ten* and 5 *ones*. Twenty-four is written 24, that is 2 *tens* and 4 *ones*. Ninety-nine is written 99, that is 9 *tens* and 9 *ones*.

When we wish to write a number larger than 99 we use three figures. One hundred is written 100, that is 1 *hundred*, no *tens*, and no *ones*. Seven hundred sixty-four is written 764, that is 7 *hundreds*, 6 *tens*, 4 *ones*. Eight hundred five is written 805, that is 8 *hundreds*, no *tens*, and 5 *ones*.

Five hundred ninety is written 590, that is 5 *hundreds*, 9 *tens*, and no *ones*.

EXERCISE I.

Read the following numbers and write them in words if you can :

1. 7.	**6.** 48.	**11.** 99.	**16.** 110.
2. 11.	**7.** 59.	**12.** 125.	**17.** 107.
3. 17.	**8.** 66.	**13.** 168.	**18.** 444.
4. 26.	**9.** 70.	**14.** 130.	**19.** 709.
5. 33.	**10.** 83.	**15.** 117.	**20.** 911.

Set down the following numbers in figures :

21. Eighty. **22.** Ninety-one. **23.** One hundred six. **24.** Two hundred forty. **25.** Three hundred seventy-seven. **26.** Six hundred nineteen. **27.** Nine hundred eleven.

6. ORAL.—What are these? Cards of matches. Count them as I split them up and drop them on the desk. How many are on the desk? 20.

I wish some girl to come and divide them into groups of four each. Who will come? Ethel. Now let us see what Ethel does? She takes them all in her hand and counts out 4 matches and lays them on one part of the desk, then another 4 near them, then another and another and another. She has laid them all down. Are there 4 matches in each group, Ethel? Yes. Thank you, you may sit down. How many matches had we? 20. How many groups are there? 5. How many matches in each group? 4. How many 4's are there in 20? 5.

Now, Maggie, will you please give me the groups one at a time? Thank you. How many times did Maggie give me 1 group? 5 times. How many matches in each group? 4. How many matches did I get? 20. What do 5 *fours* make? 20.

Let a boy now take 4 matches and lay them on that desk. How many are left? You do not know, so we must count. How many now? 16. Then 4 from 20

leaves—? 16. Let another boy take 4. How many are left in my hand? Let us count. How many now? 12. Then 4 from 16 leaves—? 12. Let another 4 be taken. How many are left now? What! must we count again? Well, what do we find? 8. Then 4 from 12 leaves—? 8. Now, when we place another 4 on the desk you must try to know the remainder without counting. How many? 4. I now place the last 4 on the desk. What is left when 4 is taken from 20? 16. 4 from 16? 12. 4 from 12? 8. 4 from 8? 4. 4 from 4? 0.

I now lay the groups on my desk and wish you to add the numbers in each group without counting. I lay down 4 and now I add another 4 making—? 8. And another 4 making—? 12. And another 4 making—? 16. And another 4 making—? 20. How many 4's in 20? 5. 4 from 12? 8. 4 and 4 and 4? 12.

7. If one girl has 4 cents, another 9, another 6, another 5 and another 7, how many cents have the five girls?

To work this on a slate or on paper, we set down the numbers under each other, thus:

EXAMPLE 1.

Addends: 4 cents.
9 "
6 "
5 "
7 "

Sum: 31 cents.

We say 7 and 5 are 12; 12 and 6 are 18; 18 and 9 are 27; 27 and 4 are 31.

With some practice, we will be able to add thus: 7, 12, 18, 27, 31.

EXERCISE II.

Write down the following numbers and add them:

1.	2.	3.	4.	5.
2	2	1	2	3
3	4	3	1	2
1	1	2	4	4
2	3	4	5	1
4	1	1	3	5
3	4	5	2	6

6. 4, 2, 3, 5, 1, 2

7. 3, 5, 1, 6, 2, 3

8. 5, 2, 6, 3, 2, 4

9. 4, 2, 3, 5, 1, 7

10. 2, 3, 4, 5, 6, 7

11. 5, 4, 3, 6, 7, 8

12. 3, 5, 7, 4, 2, 6

13. 4, 5, 6, 7, 8, 9

14. 3, 7, 2, 8, 3, 4, 4

15. 4, 3, 1, 7, 2, 9

16. 31, 43, 70, 52, 62

17. 52, 63, 81, 40, 73

18. 48, 81, 52, 70, 92

19. 94, 60, 21, 40, 84

20. 21, 43, 90, 11, 74

21. 301, 124, 433, 131

22. 324, 131, 202, 132

23. 132, 404, 61, 402

24. 825, 20, 211, 302

25. 3, 1, 4, 2, 6, 3, 7, 9

26. 4, 3, 7, 5, 9, 2, 8, 4

27. 7, 6, 8, 5, 9, 4, 7, 5

28. 5, 9, 4, 8, 3, 6, 9, 7

29. 3, 4, 5, 6, 7, 8, 9, 4

30. 2, 3, 4, 5, 6, 7, 8, 9

8. When we say "17 cents," or "6 books," each *one*, or *unit*, in the 17 is 1 cent, and each *one*, or *unit*, in the 6 is 1 book. In such expressions, the 17 cents and the 6 books are **concrete numbers.**

9. If the units in two or more numbers are all alike, as in 4 pens, 6 pens and 9 pens, the 4, 6 and 9 are **like numbers;** but if the units are unlike, as in 4 pens, 6 pencils and 9 crayons, the 4, 6 and 9 are **unlike numbers.**

10. All *concrete* numbers are either *like* or *unlike.*

When no particular unit is named or understood, as in 6, 8, 11, the 6, 8 and 11 are **abstract numbers.**

11. All abstract numbers can be added; but of concrete numbers, only like numbers can be added.

The sum of 3, 4 and 8 is 15. The sum of 3 horses, 4 horses and 8 horses is 15 horses. What is the sum of 3 horses, 4 cows and 8 sheep? Of 3 men, 4 lectures and 8 minutes?

12. ORAL.—1. Name the abstract numbers in the following: 20 dogs, 8 men, 19 eggs, 12 inches, 9, 3 cords, 12, 23 hens, 50, 2, 8 robins, 9 birds, 5 inches, 6 eggs, 14.

2. Name the concrete numbers.

3. Name the concrete numbers that are like numbers.

4. Name each concrete number that is unlike all the others.

EXERCISE III.

1. A girl who had 63 cents in her bank earned 32 cents more. How many had she then?

2. A boy carried 2 baskets of apples from the orchard. There were 74 apples in one basket and 83 apples in the other. How many apples did the boy carry?

3. A boy who was looking for eggs in the barn found one nest with 8 eggs, one with 5, one with 7 and one with 9. How many eggs did he find?

4. A gentleman sold a horse for 92 dollars, a cow for 84 dollars, a calf for 11 dollars and a lamb for 2 dollars. How much money did he get?

5. January has 31 days, and February, except in leap years, has 28. How many days have the first 2 months of the year?

6. March has 31 days, April 30, May 31 and June 30. How many days in these 4 months?

7. The month of July has 31 days, August 31, September 30, October 31, November 30 and December 31. How many days in the last 6 months of the year?

8. If one farmer has 72 sheep, another 66 and another 81, how many sheep have the three farmers?

9. A boy shoots an arrow 235 feet up the road and another arrow 163 feet down the road. How many feet are the two arrows apart?

10. A girl walked to her aunt's house, which was 324 yards aw[illegible], and came back again. How many yards did she walk?

11. dd thirty-one, fifty-three, forty-two and seventy.

12. Add twelve, three hundred forty-two, two hundred eleven and four hundred thirty-three.

13. ANALYSIS OF THE NUMBER 6. Questions to be asked by the teacher:

1. If I have 6 pens to be put in boxes, 2 in each box, how many boxes will I require? When I put 3 in each box?

2. How many 2's in 6? How many 3's?

3. What do 2 threes make? 3 twos?

4. What part of 6 is 3? What part is 2?

5. 3 is one-half of what number? 2 is one-third of what number?

6. 2 times 3 are how many? 3 times 2?

7. How many 2-cent stamps will 6 cents buy? How many 3-cent stamps?

8. When there are 6 boxes of pens on a table, with 6 pens in each box, what different number of pens could you take from each box, and how many would be left in each box?

9. A boy who has both hands closed says that he holds 6 marbles. How many can possibly be in each hand?

14. ANALYSIS OF 18. Questions to be asked by the teacher:

1. How many 2's in 18? How many 3's? 6's? 9's?

2. How many are 2 nines? 3 sixes? 6 threes? 9 twos?

3. What part of 18 is 9? What part is 6? 3? 2?

4. Of what number is 9 one-half? 6 is one-third of what number? 3 is one-sixth of what number? 2 one-ninth?

5. 2 times 9 make what number? 3 times 6? 9 times 2? 6 times 3?

6. Count 18 by 3's. Ans.: 3, 6, 9, 12, 15, 18. Count 18 by 2's. By 6's. By 9's.

7. When you give away 18 cents by 2's how many are left each time? When you give away by 3's? By 6's? By 9's?

8. Name all the different numbers which can be taken from 18, one at a time, and the number that will be left each time?

9. What different numbers, taken two at a time, can be added to make 18? What numbers, each larger than 3, ca added to make 18? Ans. 6, 6, 6. 4, 5, 9, etc.

15. The following table illustrates our system of notation:

Periods.	6th.			5th.			4th.			3rd.			2nd.			1st.		
Names of Periods.		Quadrillions.			Trillions.			Billions.			Millions.			Thousands.			Ones.	
Places.	Hundreds.	Tens.	Ones.	Hundreds.	Tens.	Ones.	Hundreds.	Tens.	Ones.	Hundreds.	Tens.	Ones.	Hundreds.	Tens.	Ones.	Hundreds.	Tens.	Ones.
													8	2	9	0	0	2
										3	0	4	6	0	0	0	8	0
	3	4		0	7	8	7	2	6	0	0	0	8	5	0	1	2	9

The first number is read *eight hundred twenty-nine thousand, two.*

The second *three hundred four million, six hundred thousand, eighty.*

The third *thirty-four quadrillion, seventy-eight trillion, seven hundred twenty-six billion, eight hundred fifty thousand, one hundred twenty-nine.*

A thousand ones we call a thousand, written 1,000.
A thousand thousands we call a million..... " 1,000,000.
A thousand millions we call a billion, " 1,000,000,000.
A thousand billions we call a trillion, " 1,000,000,000,000.
A thousand trillions we call a quadrillion..... written 1,000,000,000,000,000.

The periods above quadrillions are quintillions, sextillions, septillions, octillions, etc.

EXERCISE IV. (a).

Write the following numbers in words :

1. 310.
2. 906.
3. 3172.
4. 4877.
5. 8019.
6. 7033.
7. 7506.
8. 4404.
9. 9005.
10. 1001.
11. 32748.
12. 12409.
13. 58604.
14. 47080.
15. 90630.
16. 70206.
17. 86005.
18. 623715.
19. 104401
20. 308030.
21. 760025.
22. 900843.
23. 710006.
24. 190190.

EXERCISE IV. (b).

Write the following numbers in words:

1. 8018.
2. 701003.
3. 650010.
4. 600700.
5. 800119.
6. 7016130.
7. 7100800.
8. 6130049.
9. 9000009.
10. 8372694.
11. 1020304.
12. 70806910.
13. 1111111111.
14. 9000000019.
15. 3200070500700000.
16. 6473851927364.
17. 1300013013.
18. 7001010200005050.

EXERCISE V. (a).

Write in figures :

1. Two hundred nine.
2. Eight hundred eighteen.
3. Three thousand, four hundred ninety-two.
4. Seven thousand, eight hundred twenty.
5. Four thousand, fifty-seven.
6. Six thousand, one hundred four.
7. Five thousand, six.
8. Twenty-four thousand, six hundred eighty-five.
9. Seventy thousand, four hundred nineteen.
10. Fifty-five thousand, sixty.
11. Two hundred thirty-six thousand, one hundred ninety-one.

NOTE.—The pupil when going over the book for the first time need not work the exercises marked (*b*); but afterwards both (*a*) and (*b*) should be done.

12. Seven hundred seventy-five thousand.
13. Eight hundred thousand, eight.
14. Two hundred thousand, two hundred two.
15. Three hundred thirty thousand, eleven.

EXERCISE V. (b).

1. One million, six hundred eighty-seven thousand, nine hundred fourteen.
2. Three thousand, thirteen.
3. Three million, fourteen thousand, four.
4. Seven million, seven hundred seventy.
5. Fifty million, five hundred thousand, forty-five
6. Four hundred seventy-two million, one.
7. Eight hundred seven million, six hundred five thousand, four hundred three.
8. Ninety million, nine hundred thousand, nine hundred.
9. Two hundred twelve million, eleven thousand, fifty.
10. Three billion, two hundred four million, one hundred thirteen thousand, five hundred sixteen.
11. Four hundred ninety-seven billion, two hundred million, forty thousand, six.
12. Six trillion, eight hundred ninety-six billion, seven hundred ten million, one hundred ninety thousand, seven hundred twelve.
13. Seven hundred trillion, seventy billion, seven million, sixty thousand, five hundred.
14. Nine quadrillion, forty trillion, four billion, eight hundred million, nineteen thousand, one hundred five.
15. Nine quadrillion, ninety million, nine.
16. Two hundred one quadrillion, ten billion, ten thousand.

16. ORAL. The teacher should ask the following questions, and many similar ones:

1. How many digits, or figures, do you require in writing a hundred? A thousand? (A million? A billion?)

2. When you take a dozen splints and tie them up in bundles of 2, 3, 4 and 6, how many bundles will you have each time?

3. What is the length of your book in inches? The breadth? Length of your slate? Breadth?

4. How many 2's in 24? 3's? 4's? 6's? 8's? 12's?

5. How many cents are 6 three-cent stamps worth? 3 six-cent stamps? 4 five-cent stamps? 5 eight-cent stamps? 11 two-cent stamps? 7 four-cent stamps?

6. A boy who had 20 marbles lost 5 and then lost 3. How many had he left?

7. How many pounds of sugar, at 5 cents a pound, can be bought for a 10-cent piece? A 25-cent piece? A 50-cent piece? A dollar bill?

8. Name as many silver coins as you can. If you had one of each how much money would you have?

9. Let one pupil draw a line on the board. Let all the others write down in inches, or in feet and inches, what they think is its length. Let the pupil who drew it measure it and write its length on the board. Let all report the *difference* between their estimate and the correct length. Repeat occasionally.

10. When you take a quart of water, how many times can you fill the glass by the bucket out of it?

17. One of the best possible exercises in audition, either with or without the pencil, is to begin with a number and add either itself or another number to it, and to each successive *sum*, a given number of times.

EXAMPLE 2.—

Begin with 9 and add 9 four times.

$$\begin{array}{r} 9 \\ 9 \\ \hline 18 \text{ sum.} \\ 9 \\ \hline 27 \text{ sum.} \\ 9 \\ \hline 36 \text{ sum.} \\ 9 \\ \hline 45 \text{ sum.} \end{array}$$

The beginner should make a separate question of each step, as above, but the *practice* should be continued until any number up to 10 can be increased, orally, by any number not greater than 10 a given number of times.

When we begin with 2 and increase by 3's eleven times we get 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35.

EXERCISE VI.

1. Begin with 1 and increase by 1's eleven times
2. " " 2 " " 2's " "
3. " " 3 " " 3's " "
4. " " 4 " " 4's " "
5. " " 5 " " 5's " "
6. " " 6 " " 6's " "
7. " " 7 " " 7's " "
8. " " 8 " " 8's " "
9. " " 9 " " 9's " "
10. " " 10 " " 10's " "
11. " " 2 " " 7's " "
12. " " 5 " " 7's " "
13. " " 3 " " 8's " "
14. " " 6 " " 8's " "
15. " " 1 " " 7's " "
16. " " 4 " " 7's " "

17. Begin with 9 and increase by 6's eleven times.
18. " " 6 " " 7's " "
19. " " 1 " " 9's " "
20. " " 3 " " 9's " "
21. " " 5 " " 8's " "
22. " " 6 " " 9's " "
23. " " 9 " " 7's " "
24. " " 11 " " 11's " "
25. " " 12 " " 12's " "

18. If the sum of the numbers in any column which we add is more than 9, write the *ones* figure of the sum under the column added and add the number of *tens* to the next left hand column.

EXAMPLE 3.—

Addends.	792	7 and 6 are 13; 13 and 2 are 15. Set down 5.
	346	1 and 9 are 10; 10 and 4 are 14; 14 and 9 are 23. Set down 3.
	897	2 and 8 are 10; 10 and 3 are 13; 13 and 7 are 20. Set down 20.
Sum	2035	

EXAMPLE 4.—

87403	Add thus:
20937	7, 16, 22, 26, 33, 36. Set down 6.
80694	3, 12, 20, 29, 32. Set down 2.
7586	3, 11, 18, 23, 29, 38, 42. Set down 2.
49799	4, 13, 20, 27. Set down 7.
807	2, 6, 14, 16, 24. Set down 24.
247226	

On adding the column of ones we get 36 ones, which is 3 tens and 6 ones. We set down the 6 ones and add the 3 tens to the column of tens.

On adding the column of tens we get 32 tens, which is 3 hundreds and 2 tens. We set down the 2 tens under the place of tens and add the 3 hundreds to the column of hundreds. On adding the column of hundreds we get 42 hundreds, which is 4 thousands and 2 hundreds. We set down the 2 hundreds under the place of hundreds and add the 4 thousands to the column of thousands, and so on to the last column, when we set down both figures.

EXERCISE VII. (a).

Add the following:

1. 32, 24, 71
2. 74, 90, 84
3. 63, 22, 86
4. 91, 63, 84
5. 54, 63, 87
6. 95, 34, 76
7. 56, 65, 88
8. 77, 88, 99
9. 29, 41, 85, 68
10. 72, 83, 94, 65
11. 63, 74, 85, 96
12. 64, 86, 75, 97
13. 321, 643, 925
14. 423, 534, 645
15. 321, 654, 987
16. 456, 789, 123
17. 324, 693, 804, 351
18. 472, 907, 174, 859
19. 550, 619, 384, 816
20. 293, 759, 886, 977
21. 3907, 4863, 7592, 346
22. 7816, 3094, 947, 8305
23. 1070, 963, 7409, 875
24. 5409, 9073, 8007, 480
25. 7489, 6900, 9385, 7063, 8999
26. 1234, 5678, 9088, 7699, 8787
27. 724, 8906, 7598, 9986, 764
28. 9370, 8675, 926, 874, 3927
29. 62928, 79372, 58436, 94957, 37489, 86935
30. 59612, 38754, 86000, 75998, 60093, 80907
31. 50026, 98754, 60909, 8771, 3905, 86438
32. 59897, 67389, 75903, 47603, 9006, 75847

EXERCISE VII. (b).

1.	780064	3.	937642	5.	7206	7.	8069
	911870		83049		100139		80690
	830000		7564		8767000		806900
	12999		9007		27409		8069000
	46873		698		690004		806
	700809		35		7770		80
					80896		8069000
2	29	**4.**	789647	**6.**	900	**8.**	3456789
	847		903		8700		345678
	6930		87496		93000		93456
	77894		79		510000		7893
	594806		5603		7034000		45678
	737895		974865		740500		934567
					87600		8934567

9. Thirty million, forty-nine thousand; eight million, eight hundred sixty-seven thousand, sixty-four; four billion, four hundred nineteen thousand; fifteen billion, six hundred nine million, five hundred; eleven million, eighty-six thousand, four.

10. Seventy-four trillion, three hundred eighty billion, six hundred eighty-seven; nine million, ninety; fifty billion, seventy-seven million, eighty-eight thousand; nine hundred trillion, nine hundred thousand, nine hundred; twenty-nine quadrillion, seven hundred sixty-three million, eighty-nine.

19. ORAL.—Many questions like the following ones should be asked by the teacher:

1. A girl who has 3 pencils of the same length finds that, end to end, they are as long as a foot rule. How long is each pencil?

2. How many times would one of those pencils have to be laid on a foot rule to measure it? On a 2-foot rule? On a yardstick?

3. A common match is 2 inches long. How many of

them, placed end to end, would measure a foot? 2 feet? A yard? Would 20 of them be more or less than a meter?

4. Write down what you think is the length of your desk. Also its breadth. The height of your chair. Let a pupil measure. What was the difference between your answer and the correct number of inches?

5. If a boy sleeps 9 hours of the 24 hours in a day, how many hours is he awake?

6. How many hours are there in 2 days? In 3 days?

7. What is the sum of the digits in the number 365? Ans. 14. In 724? 863? 879? 706?

8. How many days are there in 2 weeks? In 3? 4? 5?

9. If a boy gets 5 cents on Monday and 1 cent more each day than he got the day before, up to and including Saturday, how many cents will he get on Saturday? How many altogether?

10. Let the teacher analyze the number 10 as 6 is analyzed on page 13.

20. The sign + is called *plus*, and when placed between two numbers it means that they are to be added.

$7+4=11$, reads 7 plus 4 equals 11.

EXERCISE VIII. (a).

Find the sum of the following:

1. $71+48+96+84+100$.
2. $140+397+962+754$.
3. $874+986+375+897+769$.
4. $1200+8750+8720+4910+2000$.
5. $7035+7350+8609+9608+8960$.
6. $8796+5005+887+6090+8431$.

7. 7488 + 6666 + 7080 + 900 + 147.

8. 1010 + 7009 + 198 + 7304 + 80930.

9. 80804 + 906 + 16 + 9406 + 73101.

10. 7384 + 1000 + 10010 + 30137 + 3137.

11. 50315 + 72 + 8917 + 138 + 493.

12. 98764 + 47689 + 99983 + 87699 + 88677.

13. Thirty-seven, *plus* eight hundred nine, *plus* forty thousand, forty, *plus* ninety-eight thousand, seven hundred sixteen, *plus* twenty-nine thousand, seven hundred.

14. Ninety thousand, nine, *plus* fifty-four thousand, six hundred eighty-five, *plus* five hundred ten, *plus* one thousand one hundred, *plus* seventy-seven thousand, seventy, *plus* seven hundred eighty-nine.

EXERCISE VIII. (b).

15. 872004 + 910019 + 100789 + 6893746 + 8067.

16. 7000 + 77077 + 81306 + 540009 + 7286914 + 861374.

17. 723764 + 9876543 + 5400106 + 808 + 7639054.

18. 6937504 + 3800589 + 29 + 80046 + 3700 + 116699.

19. Four million, eighty-eight thousand, eighteen, *plus* seventy-nine million, three hundred sixty eight, *plus* five hundred ninety million, eight thousand, twenty-seven, *plus* seventy-one thousand, six hundred thirteen, *plus* nine hundred eleven million, ninety-nine thousand, fifty-five.

20. Seventeen billion, sixty-seven million, forty-nine, *plus* two hundred sixty-eight billion, seven hundred nine million, four hundred twenty thousand, *plus* ninety-nine trillion, four hundred eighty-six thousand, two, *plus* eight quadrillion, eight hundred thirty-nine trillion, six hundred forty-seven thousand, eighty-three.

EXERCISE IX.

1. A girl carried 4 books to school. The first book had 112 pages, the second 97, the third 143 and the fourth 88. How many pages in the four books.

2. Find the number of days in a year by adding the number of days in each of the 12 months as given in Exercise III.

3. A man paid 125 dollars for a horse, 110 for a wagon, 36 for harness and 420 for a barn. How many dollars has he paid altogether?

4. In one car there are 76 sheep, in another 33, in another 69, in another 50 and in another 77. How many sheep in the five cars?

5. A lady travelled 245 miles by boat, 719 by rail, 18 by stage coach and then walked two miles. What distance did she travel?

6. In a large orchard there were 106 apple trees, 63 pear trees, 48 plum trees, 59 cherry trees and 40 peach trees. How many trees in the orchard?

7. In a certain wood there are 8075 spruce trees, 923 beech trees, 6018 maples, 710 elms, 87 ash and 7719 birch. How many trees?

8. A lady has 3500 dollars in one bank, 1775 dollars in another, 5670 dollars in another and 229 dollars in her private safe. How many dollars has she altogether?

9. If there are 6870 cattle on one ranch, 3045 on another, 927 on another, 7088 on another and on another 5600, how many cattle on the 5 ranches?

10. In the year 1891 the population of Inverness County was 25779, of Victoria 12432, of Cape Breton 34244, and of Richmond 14399. What was the population of the whole Island of Cape Breton?

11. In 1891 Dartmouth had a population of 6249, Yarmouth 6089, Truro 5102, Springhill 4873, Lunenburg 4044, Amherst 3781, New Glasgow 3777, and Pictou 2999. What was the total population of the 8 towns?

12. In the same year Halifax had 38556 people, St. John 39179, Charlottetown 11374, and Winnipeg 25642. What was the united population of the four?

13. In 1891 the population of the counties of the peninsula of Nova Scotia was as follows: Guysboro 17195, Halifax 71358, Lunenburg 31075, Queens 10610, Shelburne 14956, Yarmouth 22216, Digby 19897, Annapolis 19350, Kings 22489, Hants 22052, Cumberland 34529, Colchester 27160, Pictou 34541, and Antigonish 16114. What was the population of the 14 counties?

14. In the same year Kings County, P. E. Island, had a population of 26633, Queens 45975, and Prince 36470. What was the population of the Island?

15. The population of the different counties of New Brunswick in 1891 was as follows: Albert 10971, Carleton 22529, Charlotte 23752, Gloucester 24897, Kent 23845, Kings 23087, Northumberland 25713, Queens 12152, Restigouche 8308, St. John 49574, Sunbury 5762, Victoria 18217, Westmoreland 41477, York 30979. What was the population of the whole province?

16. The following is the population of the provinces of the Dominion of Canada in 1891: Nova Scotia 450396, New Brunswick 321263, P. E. Island 109078, Quebec 1488535, Ontario 2114321, Manitoba 152506, British Columbia 98173, and the Territories 98967. Find the population of the Dominion.

NOTE.—In all addition exercises, students may test the correctness of their work by beginning at the top and adding down.

Examine the following squares, adding the lines horizontally, vertically and diagonally:

1.

4	9	2
3	5	7
8	1	6

2.

1	14	4	15
12	7	9	6
13	2	16	3
8	11	5	10

3.

1	23	10	14	17
15	19	2	21	8
22	6	13	20	4
18	5	24	7	11
9	12	16	3	25

4.

1	24	47	21	37	11	34
12	35	2	25	48	15	38
16	39	13	29	3	26	49
27	43	17	40	14	30	4
31	5	28	44	18	41	8
42	9	32	6	22	45	19
46	20	36	10	33	7	23

5. Prepare a square similar to the first, in which the sum of each column will be 12. Do not use the same digit more than once.

MULTIPLICATION.

21. 1. ORAL.—Let the teacher repeat the oral lesson on page 9, using 35 splints, dividing them into bundles of 5 each, and then into bundles of 7.

2. How many eyes have 5 children? 7? 9? 11? 13?

3. A yardstick is 3 feet long. What is the length in feet of 2 yardsticks? Of 4? Of 6? Of 8? Of 12?

4. When 1 side of a square room is 12 feet long, what is the length of 2 sides? Of 3? Of 4?

5. When there are 3 horses in a stable, how many hoofs are there? When there are 4 horses? 5? 7? 9?

6. Let the teacher ask 20 questions similar to those on page 14, all bearing on the number 20.

If a boy has 6 cents in each of his 5 pockets, how many cents has he altogether? He has $6+6+6+6+6$ or 30. In this question all the *addends* are the same, and if we know without adding that 5 *sixes* make *30*, we shorten the work very much.

374		374 Multiplicand.
374	Addends.	is shortened, 6 Multiplier.
374		2244 Product.
374		
374		The *sign of multiplication* is $\times$.
374		Thus, $4 \times 6 = 24$, reads 4 multiplied by 6
2244 Sum.		equals 24.

22. The multiplier must always be regarded as an abstract number.

23. The product will be like the multiplicand.

24. The teacher should have the pupils in all cases build up their own Multiplication Table. This has already been done in working Ex. 6. Let the exercise be repeated

over and over again if necessary until the pupil can readily increase, by itself, eleven times, any number up to 12.

Begin with 1 and increase by 1's eleven times, then begin with 2 and increase by 2's eleven times, then with 3 and with all the other numbers up to and including 12. Set down the results in each case in a single line, thus :

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

This, it will be observed, is an ordinary Multiplication Table. Vertical and horizontal lines may be drawn if desired.

25. When one number is to be multiplied by another we proceed as follows :

EXAMPLE 5.

Multiply 6023 by 3.

6023 Multiplicand.
3 Multiplier.
18069 Product.

We say 3 threes are 9; 3 twos are 6; 3 noughts are 0; 3 sixes are 18.

EXERCISE X.

Multiply :

1. 21431×2.
2. 31431×2.
3. 40342×2.
4. 62134×2.
5. 31023×3.
6. 53102×3.
7. 91132×3.
8. 83120×3.
9. 84304×2.
10. 70312×3.

11. There are 144 pens in 1 gross. How many pens are in 2 gross?

12. There were 42 pupils in 1 class. How many would have been in 4 such classes?

13. If there are 824 two-dollar bills in a drawer, how many dollars are there?

14. How many cents would you have to pay for 412 4-cent stamps?

15. If in 1 barrel there are 322 apples, how many would there be in 4 such barrels?

16. If there are 514 leaves in a book, how many pages are there?

17. A sheet of paper has 4 pages. How many pages has 802 sheets of paper?

26. ORAL.—Samples for the teacher's talks on numbers.

1. John spent 15 cents for oranges at 3 cents apiece. How many did he buy?

2. Write on the blackboard three dollars and twenty-five cents, $3.25. Four dollars and fifty cents, $4.50. Twelve dollars and seven cents, $12.07. Ten dollars and ten cents. 245 cents. 390 cents.

3. A farmer sold sheep at $3.25 each. What did he get for 2? For 3? For 4?

4. How many 25-cent pieces in 75 cents? In 2 dollars?

5. What would a farmer get for 2 bushels of potatoes at 75 cents a bushel? For 3 bushels? For 4.

6. What is the sum of all the digits?

7. How many strokes will a clock that strikes the hours make in 12 hours?

8. What different numbers, two at a time, can be added to make 11?

NOTE.—The cent point must be placed between the places of tens and hundreds.

9. If a girl buys a quart of milk each day how many pints does she buy in a week?

10. Analyze the numbers 27 and 28 as on page 13.

EXAMPLE 6.

73469
6
440814

We say 6 *nines* are 54; set down the 4 and add the 5 to the next part of the product. 6 *sixes* are 36, and five are 41; set down 1. 6 *fours* are 24, and 4 are 28; set down 8. 6 *threes* are 18, and 2 are 20; set down 0. 6 *sevens* are 42, and 2 are 44.

Or thus:

73469 Multiplicand.
6 Multiplier.

54
360
2400
18000
420000

440814 Product.

If a fuller explanation is wanted it is as follows: 9 *ones* taken 6 times equals 54 *ones*, or 5 *tens* and 4 *ones*; set down the 4 *ones* and leave the 5 *tens* to be added in with the tens. 6 *tens*, taken 6 times, equals 36 *tens*, and the 5 *tens* left over make 41 *tens*, or 4 *hundreds* and 1 *ten*; set down 1 *ten* and leave the 4 *hundreds* to be added in with the hundreds. 4 *hundreds*, taken 6 times, equals 24 *hundreds*, and four *hundreds* left over make 28 *hundreds*, or 2 *thousands* and 8 *hundreds*; set down 8 *hundreds*, etc.

EXERCISE XI.

Multiply:

1. 96324 × 2.	**4.** 91738 × 2.	**7.** 84639 × 3.
2. 73926 × 2.	**5.** 61829 × 3.	**8.** 70806 × 3.
3. 87296 × 2.	**6.** 74518 × 3.	**9.** 61374 × 4.
10. 37412 × 5.	**23.** 71426 × 7.	**36.** 29137 × 8.
11. 88277 × 3.	**24.** 57091 × 7.	**37.** 63045 × 9.
12. 38140 × 5.	**25.** 81739 × 6.	**38.** 82716 × 9.
13. 37169 × 5.	**26.** 93086 × 7.	**39.** 53748 × 9.
14. 75109 × 4.	**27.** 37968 × 7.	**40.** 92685 × 9.
15. 39648 × 5.	**28.** 46688 × 7.	**41.** 37268 × 10.
16. 93857 × 3.	**29.** 90867 × 6.	**42.** 59216 × 11.
17. 68047 × 6.	**30.** 45678 × 7.	**43.** 83424 × 11.
18. 77293 × 6.	**31.** 69328 × 6.	**44.** 69188 × 11.
19. 50963 × 6.	**32.** 92867 × 7.	**45.** 37281 × 12.
20. 83249 × 6.	**33.** 75324 × 8.	**46.** 62833 × 12.
21. 59806 × 4.	**34.** 96283 × 8.	**47.** 96817 × 9.
22. 37012 × 7.	**35.** 71936 × 8.	**48.** 84657 × 12.

EXAMPLE 7.

```
  709
  648
 5672
 2836
4254
459432
```

In multiplying by the second figure, the 4, we multiply 9 *ones* by 4 *tens* and get 36 *tens*, so that the six we set down is 6 *tens*, and it must be set down in the place of tens. And in the third figure we are multiplying by 6 *hundreds*, and 9 *ones* multiplied by 6 *hundreds* will give 54 *hundreds*; so we set the 4 in the place of *hundreds*.

Or thus:

```
  709
  648
 5672
28360
425400
459432
```

EXERCISE XII. (a).

Multiply:

1. 73619×4.
2. 58037×7.
3. 81927×8.
4. 70639×9.
5. 29568×11.
6. 38479×12.
7. 7486×34.
8. 9374×52.
9. 1839×46.
10. 7306×65.
11. 9847×27.
12. 8074×64.
13. 3849×37.
14. 9286×67.
15. 8394×82.
16. 5988×66.
17. 9708×48.
18. 4736×39.
19. 7419×76.
20. 7496×87.
21. 6074×89.
22. 6789×64.
23. 8940×78.
24. 5678×89.

EXAMPLE 8.

```
  580693
    6459
 5226237
 2903465
 2322772
3484158
3750696087
```

EXERCISE XII. (b).

Multiply:

1. 560837×85.
2. 693428×68.
3. 930062×54.
4. 769254×39.
5. 572906×97.
6. 193704×89.
7. 432634×214.
8. 703615×423.
9. 462837×526.
10. 538807×634.
11. 296078×627.
12. 751352×375.
13. 754836×734.
14. 866749×718.

15. 572906×678.
16. 123456×789.
17. 598426×3214.
18. 932516×3416.
19. 719638×4625.
20. 758306×3529.
21. 642978×6374.
22. 190624×7568.
23. 392706×639.
24. 578469×8762.
25. 876594×7864.
26. 693758×693758.

EXAMPLE 9.

$$\begin{array}{r} 8369 \\ 506 \\ \hline 50214 \\ 41845 \\ \hline 4234714 \end{array}$$

EXAMPLE 10.

$$\begin{array}{r} 3070 \\ 8004 \\ \hline 12280 \\ 2456 \\ \hline 24572280 \end{array}$$

NOTE.—The pupil's practice in numeration should now be extended to include the third or *millions* period.

EXAMPLE 11.

$$\begin{array}{r} 7184 \\ 20700 \\ \hline 5028800 \\ 14368 \\ \hline 148708800 \end{array}$$

EXAMPLE 12.

$$\begin{array}{r} 800390 \\ 700600 \\ \hline 480234000 \\ 560273 \\ \hline 560753234000 \end{array}$$

In example 9 when we multiply the 9 *ones* by 5 *hundreds* we get 45 *hundreds*, and of course the 5 must be set down under the place of hundreds.

In example 10, when we multiply the 7 *tens* by the 8 *thousands*, we get 56 *tens of thousands*, so the 6 must be set under the place of tens of thousands.

In multiplying 4 *ones* by 7 *hundreds* in example 11, the product is 28 *hundreds*, so as the 8 we set down is 8 *hundreds*, we indicate the same by placing two *noughts* on its right.

So also in example 12 our first product 54, is *thousands*, and the 4 is written as such.

NOTE.—Hence the product of any two digits will be set down as many places from the right hand side as are equal to the sum of the digits on the right of *both* the digits multiplied together.

EXERCISE XIII. (a).

Multiply:

1. 71246 × 402.
2. 87256 × 804.
3. 74892 × 705.
4. 39268 × 809.
5. 58672 × 630.
6. 46280 × 740.
7. 68089 × 870.
8. 39674 × 980.
9. 8506 × 7108.
10. 7520 × 8006.
11. 3707 × 5008.
12. 3098 × 9023.
13. 6900 × 3007.
14. 8600 × 10203.
15. 8649 × 6300.
16. 7960 × 78000.
17. 8070 × 6090.
18. 8900 × 67002.

EXERCISE XIII. (b).

Multiply:

19. 829157 × 70040.
20. 731000 × 137000.
21. 300960 × 81006.
22. 911007 × 80500.
23. 700809 × 700809.
24. 800607 × 706008.
25. 309700 × 800700.
26. 670089 × 678900.
27. 900008 × 800009.
28. 203040 × 506070.
29. 300202 × 202008.
30. 706 × 8003200.

27. Continued Product.—Factors.

$10 \times 2 = 20$; $20 \times 3 = 60$.

$7 \times 5 = 35$; $35 \times 3 = 105$; $105 \times 2 = 210$.

The *continued product* of $10 \times 2 \times 3 = 60$.

The *continued product* of $7 \times 5 \times 3 \times 2 = 210$.

10 and 2 are *factors* of 20; 20 and 3 are *factors* of 60.

So, also, 7, 5, 3 and 2 are *factors* of 210.

The *factors* of a number, when multiplied together, will produce the number, as $10 \times 2 \times 3 = 60$. $3 \times 4 \times 5 = 60$. $2 \times 2 \times 3 \times 5 = 60$.

28. Oral.

1. What is the continued product of 5, 3 and 2? Of 3, 4 and 5?

2. What are the factors of 6? 9? 10? 12? 21? 39?

3. Two coach-houses, with 3 wagons in each, would have in them how many wheels? 3, with 5 wagons in each? 3, with 7?

4. Name *three* factors of 12. Of 18. Of 24. Of 30. Of 27. Of 48.

5. What is the continued product of the digits from 1 to 5, inclusive?

6. Name 2 factors of 32. Name 3 factors of 32. Of 45.

EXERCISE XIV.

Find the continued product of the following :

1. $26 \times 3 \times 4$.
2. $34 \times 5 \times 3$.
3. $97 \times 5 \times 6$.
4. $7 \times 8 \times 97$.
5. $120 \times 9 \times 8$.
6. $9 \times 7 \times 6 \times 8$.
7. $17 \times 4 \times 9 \times 2$.
8. $58 \times 60 \times 18$.
9. $92 \times 64 \times 13$.
10. $325 \times 7 \times 6$.
11. $75 \times 125 \times 87$.
12. $85 \times 64 \times 79$.
13. $12 \times 11 \times 9 \times 8 \times 7$.
14. $13 \times 8 \times 6 \times 4 \times 2$.
15. $700 \times 800 \times 101$.
16. $20 \times 4 \times 25 \times 16 \times 16$.
17. $8 \times 40 \times 5 \times 3 \times 12$.
18. $8 \times 7 \times 3 \times 250$.
19. $72 \times 63 \times 54 \times 45$.
20. $44 \times 4 \times 206 \times 103$.

29. Instead of the multiplier we can always use its factors, thus :

EXAMPLE 13.

167	167	167	167
48	12	8	3
1336	2004	1336	501
668	4	6	2
8016	8016	8016	1002
			2
			2004
			2
			4008
			2
			8016

EXERCISE XV.

Multiply the following numbers, using factors not greater than 12.

1. 872×24.
2. 915×27.
3. 7384×16.
4. 8691×15.
5. 7108×36.
6. 3946×42.
7. 8302×64.
8. 97268×72.
9. 75863×88.
10. 75308×96.
11. 50906×99.
12. 75263×81.
13. 50678×105.
14. 69384×210.
15. 72006×108.
16. 63082×121.
17. 38196×132.
18. 27891×84.
19. 986087×48.
20. 594089×144.

EXERCISE XVI.

1. There are 253 apples in one basket. How many would there be in 3 such baskets?

2. A girl lives 375 yards from the school. How many yards will she walk in going over the road 6 times?

3. In a certain wall there are 38672 bricks. How many bricks would there be in 7 such walls?

4. How many yards are there in 28 miles, 1760 yards being the length of 1 mile?

5. What would a drove of 87 oxen weigh when the average weight of each ox is 1396 pounds?

6. Sound travels about 1142 feet in a second. How far from a cannon could the sound be heard 9 seconds after the cannon is fired?

7. How many oranges in 49 cases when there are 896 in each case?

8. If 3756 people, on an average, cross a certain bridge each day, how many will cross in a year, that is in 365 days?

9. There are 5280 feet in a mile. How many feet would you travel in going 8 times between two towns that are 9 miles apart?

10. A man has 3 rolls of five-dollar bills. In the first there are 36 bills, in the second 27 and in the third 18 bills. How much money has he?

11. If there are 97 regiments in an army and 678 men in each, how many men are in the army?

12. What would the 7695 cattle on a certain ranch be worth at $26 per head?

13. How many bushels of oats can be stored on the 3 floors of a granary, when each floor has 18 bins holding 86 bushels each.

14. A field has 59 rows of corn, and there are 287 stalks in each row. How many stalks in 8 such fields?

15. A certain web of calico has 516 checks on each yard. How many checks on 9 webs of 56 yards each?

16. How many steps will a boy take in walking 268 miles when he takes 2097 steps in 1 mile?

17. A merchant bought 863 barrels of flour at $4 per barrel, and 438 at $6 per barrel. How many dollars did the flour cost?

EXAMINATION PAPER. No. 1.

(TIME: ONE HOUR. VALUE OF EACH QUESTION, 10.)

1. Write in words 2009, 31013 and 70006040.

2. Set down in figures: thirteen thousand nine hundred; ten million, fifty thousand four; nineteen million, eight hundred six thousand.

3. Find the sum of $8087+29+93764+86111+4900+603$.

4. Multiply 803679 by 7.

5. Four boys count their marbles. The first has 24, the second 37, the third 19, and the fourth as many as the other three. How many have all?

6. There are 9 rooms in a house; each room has 2 windows, and each window 8 panes of glass. How many panes of glass in the house?

7. How many cents could you get for 68 twenty-five cent pieces?

8. If a boy walks 3 miles every forenoon and 4 every afternoon for 18 days, how many miles does he walk?

9. A freight train consists of 26 cars, and each car contains 86 barrels of flour. What is the value of the flour at $5 per barrel?

10. A farmer bought 15 acres of land at $24 per acre and 27 acres at $9 per acre. How much money did he pay for the land?

SUBTRACTION.

30. A girl who had 10 cents, spent 4 cents for an orange. How many cents has she left?

She has the whole 10 cents except the 4 cents she spent. The 4 cents she spent added to what she now has would make 10 cents. Now how many cents must be added to 4 cents to make 10 cents? 6 cents. Then 4 taken from, or *subtracted* from, 10 leaves—? 6.

31. ORAL.—Samples for the teacher:

1. What number must be added to 8 to make 12? 8 from 12? 4 from 12?

2. What number must be added to 5 to make 13? 5 from 13? 8 from 13?

3. What number must be added to 7 to make 16? 7 from 16? 9 from 16?

4. What change should you get when you buy 2 peaches at 3 cents each and give a 10-cent piece in payment?

5. What change when you buy 3 pounds of rice at 6 cents a pound and give a 25-cent piece?

6. When you buy slates at 11 cents each with a 50-cent piece, how many slates will you get and what change?

7. Begin with 50 and subtract 3 each time as often as possible. Diminish 50 by 4's. By 5's. By 6's. By 7's. By 8's. By 9's.

32. The sign of Subtraction is $-$, and is called *minus*. $7-4=3$, reads 7 minus 4 equals 3.

EXERCISE XVII.

Write down the following expressions and fill in the part wanting in each:

1. $7-4=(\ \ )$.
2. $9-4=(\ \ )$.
3. $11-6=(\ \ )$.
4. $10-3=(\ \ )$.
5. $13-7=(\ \ )$.
6. $14-6=(\ \ )$.

7. $16-8=(\ )$.	**12.** $(\ )-6=5$.	**17.** $21-8=(\ )$.
8. $18-9=(\ )$.	**13.** $7+8-9=(\ )$.	**18.** $34-7=(\ )$.
9. $17-8=(\ )$.	**14.** $15-(\ )=6$.	**19.** $(\ )-7=10$.
10. $9-(\ )=5$.	**15.** $(\ )-8=5$.	**20.** $24-(\ )=16$.
11. $12-(\ )=7$.	**16.** $29-7=(\ )$.	

The teacher should put dozens of exercises like the above on the board.

33. When one number is to be taken from another we arrange them as in addition, always placing the one which is not greater than the other below.

EXAMPLE 14.

837395 Minuend.	2 from 5 leaves 3; set down 3.
234312 Subtrahend.	1 from 9 leaves 8; set down 8.
603083 Remainder.	3 from 3 leaves 0; set down 0, etc.

EXAMPLE 15.

283946
2703
281243

EXERCISE XVIII.

Subtract the following:

1. 2684 / 1342	**7.** 88466 / 25413	**13.** 946873 / 224422	**19.** 972846 / 552403
2. 3745 / 2132	**8.** 96875 / 62522	**14.** 698749 / 131645	**20.** 864937 / 251624
3. 6485 / 4133	**9.** 687495 / 326134	**15.** 986952 / 534720	**21.** 736480 / 514320
4. 9467 / 4153	**10.** 768594 / 352344	**16.** 846758 / 304046	**22.** 543678 / 110432
5. 84639 / 44214	**11.** 749684 / 444444	**17.** 888769 / 384052	**23.** 866477 / 724163
6. 34968 / 14742	**12.** 839476 / 333333	**18.** 718296 / 312052	**24.** 927360 / 721320

25. 791384	**27.** 988755	**29.** 756834	**31.** 893240
260154	272152	753431	193130
26. 846977	**28.** 844937	**30.** 748634	**32.** 798406
32913	43811	41004	93106

34. The minuend and subtrahend must both be either abstract or like numbers.

EXERCISE XIX.

1. A farmer who had 94 bushels of barley sold 63 bushels. How many bushels had he left?

2. John has 39 marbles and James has 16 less. How many has James?

3. Annie, who has 98 cents, has 67 cents more than Ruth. How many has Ruth?

4. A barrel of flour weighs 196 pounds. When a grocer has sold 54 pounds out of a barrel, how much flour is left?

5. A boy who started to run a mile, that is 1760 yards, became tired at the end of 240 yards. How many yards had he still to run?

6. Arthur has 25 marbles and William 24. They put them into the same box and then took out 16. How many were left in the box?

7. A lady, who had a barrel containing 297 apples, used 144 of them. How many had she left?

8. A boy who was carrying a basket with 4 dozen eggs broke 15 of them. How many were unbroken?

9. John had 52 marbles and James 37, all of which they put into a box. Horace had 31 and Charles 42, all of which they put into another box. How many more were in the one box than in the other?

10. In one box there are 7 dozen buttons, and in another 5 dozen and 8. How many more in the first box than in the second?

11. From 289 take 12 times 13.

12. From the continued product of $5 \times 5 \times 3$ take the continued product of $3 \times 3 \times 2 \times 2 \times 2$.

13. From the continued product of $9 \times 8 \times 4$ take the continued product of $7 \times 3 \times 3 \times 2$.

14. From the sum of 2536 and 2431 take 2463.

15. From the sum of 2883 and 5486 take 7125.

16. From the sum of 2006, 3840 and 1152 take 3726.

17. A merchant got $2739 from one man, $4276 from another and $2061 from another. He then paid out $4063. How many dollars had he left?

18. From a town where there were 9675 people, 1130 went to Manitoba. How many remained in the town?

19. A company bought a gold mine for $7685 and sold it for $5620. What did they lose?

20. A company bought a coal mine for $48480, and spent $12625 in opening it. They then sold it for $65775. What did they gain?

35. ORAL.—Let the teacher take an apple and divide it into two equal parts, then into four. Let another apple be divided into three equal parts, then into six.

Describe a circle on the board and draw one diameter. Take another circle and draw two diameters, cutting each other at right angles. In a third circle draw three radii, making equal angles with each other. In a fourth circle place radii as in the last, and produce them until the lines so produced become diameters. Get the class to name the parts of the apples. Let the divisions of the circles be then named and written down by figures thus: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$.

1. When an apple is divided into 6 parts, what is each part called? How many of the parts must you get to have one-half? What do you call 2 of the parts? 5 of them?

2. When an orange is divided into 8 equal parts, what do you call 1 of the parts? 2 of them? 3? 4? 5? 6? 7?

3. Into how many halves can anything be divided? Into how many thirds? Fourths? Fifths? Sixths? Sevenths? Eighths? Which is greater, 2 halves or 8 eighths? 3 thirds or 7 sevenths?

4. If a pineapple is divided into 9 equal parts and you get one of them, what part of the pineapple is left? If you get 2 of them? 3? 4? 5? 6? 7? 8? 9?

5. A boy who had 2 10-cent pieces and 3 cents, paid 9 cents for a slate. What money had he left? Ans. 1 ten and 4 ones.

6. Another boy who had 5 ten-cent pieces and 2 cents, paid 35 cents for an Arithmetic. What money had he left?

[Questions like the last two may be used by the teacher in explaining subtraction where it is necessary to add to the number in the minuend].

36. In our system of notation, which is the *decimal system*, 1 taken from any column becomes 10 in the next column to the right; and any two adjoining columns taken by themselves may be regarded as *tens* and *ones*.

When any column is thought of as representing *cents*, the next on the left may be regarded as representing 10-cent pieces.

EXAMPLE 16.

7528354	We cannot take 9 ones from 4 ones so we take
2584739	1 of the 5 tens (leaving there 4 tens) and put it with
4943615	the 4 ones which gives us 14 ones, then 9 ones from 14 ones leaves 5 ones. 3 from 4 leaves 1.

7 cannot be taken from 3 so we take 1 from 8 and with the 3 it gives 13; 7 from 13 leaves 6. 4 from 7 leaves 3. 8 cannot be taken from 2 so we take 1 from 5 which with the 2 gives 12; 8 from 12 leaves 4.

5 cannot be taken from 4 so we take 1 from 7 which with the 4 makes 14; 5 from 14 leaves 9. 2 from 6 leaves 4.

More briefly: 9 from 14 leaves 5. 3 from 4 leaves 1. 7 from 13 leaves 6. 4 from 7 leaves 3. 8 from 12 leaves 4. 5 from 14 leaves 9. 2 from 6 leaves 4.

Another method is to regard the 54 as 40 and 14. Then 9 from 14 leaves 5. 3 from 4 leaves 1. Again 83 is 70 and 13. 7 from 13 leaves 6. 4 from 7 leaves 3, etc.

NOTE.—Exercises in subtraction are proved by adding the *subtrahend* and the *remainder* to get the *minuend*.

EXERCISE XX.

Subtract and prove :

1.	7674 1823	11.	82737 28192	21.	74291 65493	31.	146375 146298
2.	7589 3924	12.	84294 71836	22.	85628 67677	32.	837042 764238
3.	8468 3623	13.	85276 27629	23.	90821 37293	33.	606111 372483
4.	9825 7263	14.	75482 37625	24.	34567 34098	34.	711082 572835
5.	8765 2729	15.	53932 28266	25.	472865 174827	35.	573216 475839
6.	9382 3836	16.	94680 25265	26.	573911 184288	36.	671438 366529
7.	9273 4737	17.	93825 48777	27.	638420 239378	37.	730425 639347
8.	6484 3927	18.	75611 48123	28.	708217 83649	38.	637143 289158
9.	7486 3728	19.	53724 19836	29.	176391 98727	39.	504216 192347
10.	72648 17362	20.	63708 23774	30.	246134 77139	40.	742104 593344

EXAMPLE 17.

73046
57353
15693

In subtracting the 5 we cannot take 1 from 0, so we take 1 from 3 which in the place where the 0 stands is 10; then we take 1 from this 10 which with the 4 makes 14; 5 from 14 leaves 9. 3 from 9 leaves 6. 7 from 12 leaves 5. 5 from 6 leaves 1.

Or regard the 304 at once as 290 and 14, and say 5 from 14 leaves 9. 6 from 9 leaves 3, etc.

EXAMPLE 18.

700005
362489
337516

9 from 15 leaves 6. 8 from 9 leaves 1. 4 from 9 leaves 5. 2 from 9 leaves 7. 6 from 9 leaves 3. 3 from 6 leaves 3.

700005 is equal to 699990 and 15.

NOTE.—In cases like the above each *nought* becomes *nine* and the first significant figure is diminished by *one*.

EXERCISE XXI.

Subtract and prove :

1. 59046 24373	**9.** 72030 47258	**17.** 724000 298765	**25.** 134005 112738
2. 60592 24678	**10.** 46032 27809	**18.** 825000 654321	**26.** 200300 107108
3. 73402 15488	**11.** 56024 15028	**19.** 903000 276004	**27.** 800000 765432
4. 84601 77777	**12.** 80672 20839	**20.** 710022 300758	**28.** 100000 2006
5. 92730 39299	**13.** 720803 478629	**21.** 370004 52738	**29.** 400011 320013
6. 87200 27488	**14.** 430062 112389	**22.** 806103 207304	**30.** 711000 241008
7. 93024 88888	**15.** 500600 293456	**23.** 730009 249183	
8. 27003 18276	**16.** 901030 278364	**24.** 740002 662078	

EXERCISE XXII.

1. John was carrying a bag with 213 marbles, but when he counted them he had only 174. How many did he lose?

2. A house was bought for $1648 and sold for $1950. What was the gain?

3. The battle of Hastings which was fought in the year 1066 was how many years before the battle of Waterloo fought in the year 1815?

4. A man who had 7000 acres of land sold 3075 acres. How many had he left?

5. A man who earns $1600 a year spends $128 every month. How much does he save?

6. In the year 1881 there were 1799 school sections in Nova Scotia, and in 1891 there were 1908. What was the increase?

7. The population of St. John in 1871 was 28805, and in 1891 it was 39179. What was the increase in the 20 years?

8. A man who paid $245 for a horse, $165 for a wagon and $86 for harness, sold the three for $500. How much did he gain or lose?

9. Montreal had 155237 people in 1881, and 216650 in 1891. What was the increase?

10. Toronto had a population of 96196 in 1881, and 181220 in 1891. What was the increase?

11. A man who owed $2050, paid at one time $686, and at another time $758. How many dollars did he still owe?

12. A man bought goods one day for $895, and the next for $1042. He made two payments, one of $965 and another of $684. How many dollars remained unpaid?

13. The population of Halifax in 1881 was 36100, and in 1891 was 38556. The population of Quebec in 1881 was 62446, and in 1891 was 69090. Which city had the greater increase, and how much greater was it?

14. The population of Ottawa in 1881 was 31307, and in 1891 was 44154. That of Winnipeg in 1881 was 7985, and in 1891 was 25642. By how many did the increase in Winnipeg exceed that in Ottawa?

15. In 1881 Cumberland Co. had 27368 people, and Lunenburg Co. 28583. In 1891 Cumberland had 34529, and Lunenburg 31075. How much greater was the increase in Cumberland than in Lunenburg?

EXERCISE XXIII.

SIGNS.

NOTE.—The operation of Multiplication will always be performed *before* that of Addition or Subtraction.

1. $7280 - 2496$.
2. $139 \times 6 - 709$.
3. $769 \times 9 + 250 - 130$.
4. $8068 \times 4 + 3789 - 7600$.
5. $7532 \times 7 + 38462 - 7774$.
6. $3192 \times 12 - 9876 + 6789$.
7. $8924 - 7899 + 6934 - 5863$.
8. $5486 + 7789 + 4006 - 16864$.
9. $7763 - 4498 - 2263 - 199$.
10. $5986 \times 8 - 36892 - 9386$.
11. $59006 + 880 - 59885$.
12. $746 \times 86 \times 3 - 74686$.
13. $120004 - 73089 - 654 - 8348$.
14. $730 \times 9 \times 8 - 8234 - 18679 - 20008$.
15. $19 \times 23 \times 17 + 998 - 7409$.
16. $80061 - 38708 + 12566 - 7644$.
17. $7603 \times 708 \times 3 - 407629 - 70089$.
18. $9009 \times 909 + 808087 + 96834 - 128004$.
19. $2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 - 98765$.
20. $12 \times 13 \times 14 \times 15 - 20707 + 7070$.

35. ORAL.—The teacher should ask the following questions and many others of a similar character:

1. What is the sum of 13 and 17? 9, 8 and 6? 16 and 25?

2. What number must you add to 9 to make 30? To 12? To 16?

3. How much greater is the product of 4 and 3 than their sum? Of 5 and 6? 8 and 4? 9 and 3?

4. Mary, who had a fifty-cent piece, bought a picture book and had 18 cents left. What did she pay?

5. What is the remainder when you take the difference

of 12 and 8 from their sum? When you do the same with 7 and 11? 20 and 8? 9 and 15?

6. The difference between 5 and each of two other numbers is 2. What are the numbers? Between 9 and two other numbers the difference is 4. What are the numbers?

7. The product of two numbers is 35 and one of them is 7. What is the other? Product 54 and one of them 6?

8. What is the product of the sum and difference of 4 and 2? Of 5 and 3? 3 and 6? 7 and 4? 9 and 2?

9. When a fruit cake is cut into 20 pieces, how many of them must you get to have $\frac{1}{2}$ of the cake? To have $\frac{1}{4}$? $\frac{1}{5}$? $\frac{1}{10}$?

10. How many cents in $\frac{1}{4}$ of a dollar? In $\frac{1}{5}$ of a dollar? In $\frac{1}{10}$? $\frac{3}{10}$? $\frac{4}{10}$? $\frac{7}{10}$? $\frac{9}{10}$? $\frac{2}{5}$?

EXERCISE XXIV. (a).

TERMS.

1. Find the sum of 96 and 67.

2. Find the product of 96 and 67.

3. Find the difference between 96 and 67.

4. What is the sum of 806, 97, 1097 and 640?

5. What is the product of 7084 and 708?

6. What is the difference between 70031 and 8706?

7. When the addends are 934, 817, 6083 and 649, what is the sum?

8. When the multiplicand is 867 and the multiplier 768, what is the product?

9. When the minuend is 26405 and the subtrahend 14888, what is the remainder?

10. The sum of two addends is 121 and one of them is 75. What is the other?

11. If the remainder is 34 and the minuend 81, what is the subtrahend?

12. The sum of four addends is **907** and three of the addends are 69, 465 and 388. What is the other?

13. When the subtrahend is 7486 and the remainder 2906, what is the minuend?

14. When the minuend is 7486 and the remainder 2906 what is the subtrahend?

15. When the minuend is 7486 and the subtrahend 2906 what is the remainder?

16. Find the sum of the product and difference of 9 and 6.

17. Find the difference of the product and sum of 27 and 7.

18. Find the product of the sum and difference of 34 and 16.

19. Find the difference between the sum and product of 923 and 87.

20. Find the difference between the sum and product of 807 and 96.

21. When 3 boys counted their money they found the sum to be 136 cents. One had 54 cents and another 39. How many had the third?

22. A man who paid $2765 for a house finds that he has $789 left. How many dollars had he?

23. What is the sum of the product and difference of 3824 and 906?

24. Find the product of the sum and difference of 2004 and 1127.

25. Find the difference between the sum and product of 918 and 1006.

EXERCISE XXIV. (b).

1. If the multiplicand is 89726 and the multiplier 58007, what is the product?

2. When the minuend is 7300060 and the subtrahend 2869972, what is the remainder?

3. If the minuend is 7603000 and the remainder 1904001, what is the subtrahend?

4. If the subtrahend is 87207 and the remainder 87207, what is the minuend?

5. What is the sum of the sum, product and difference of 84 and 76?

6. What is the sum of the product, difference and sum of 209 and 187?

7. What is the sum of the difference, sum and product of 2048 and 1907?

8. The sum of 80104 and another number is 111111. What is the other number?

9. The difference between 261 and each of two other numbers is 39. What are the other numbers?

10. The difference between 732946 and each of two other numbers is 299888. What are the numbers?

11. Take the smallest number which can be formed from the first eight digits from the largest number which can be formed from the same digits, using each digit only once in each number?

12. From the product of the sum and difference of 9009 and 13040 take the product of the sum and difference of 2004 and 1894.

EXERCISE XXV.

1. If 105 men can build a wall in 17 days, in how many days can 1 man build it?

2. If 86 men can build a wall in 16 days, how many men would be required to do it in 1 day?

3. A merchant paid $167 for rice and $95 more than that for coffee. What did he pay for both?

4. A man who paid $24 for a cow, paid 4 times as much for a horse, and then sold both for $150. What did he gain?

5. An agent bought three pieces of land. For the first he paid $625, for the second $12 more than for the

first, and for the third $13 more than for the second. How much did he pay for the three?

6. A man sold 96 acres of land at $48 per acre, and then bought 86 acres at $39 per acre. How much did he get more than he paid?

7. In one town there are 3261 people, and in another 9 times as many and 850 more? How many are in the second town?

8. A fruit-grower who sold 28 barrels of apples at $3 a barrel, and 26 bushels of egg-plums at $4 a bushel, bought 4 barrels of flour at $6 a barrel and a barrel of sugar for $18. He also paid $45 to each of his 2 hired men. How many dollars had he left?

9. A farmer sold 65 sheep at $3 per head and 8 cows at $24 per head. He paid $17 for tea and sugar, $23 for flour and cornmeal and $125 for a new reaper, and then put the rest of his money in the bank. How much money did he put in the bank?

10. A man bought 3 building lots in a city. For the first he paid $265, for the second twice as much as for the first, and for the third twice as much as for the second. What did he pay for the three?

11. A man who earns $125 per month pays a yearly rent of $285 and $38 taxes; he pays for light and fuel $109, for household expenses $725, and gives away $185. What can he save per year?

12. If 18 men could shingle a building in 8 days, in how many days could 1 man shingle it?

13. If 136 horses eat 12 tons of hay in 6 days, how long would the same number of tons last 1 horse?

14. A drover who bought 46 head of cattle at $23 per head, and 57 at $27 per head, sold them all at $26 per head. What was his gain or loss?

15. A book which has 366 pages has 38 lines on each page and an average of 9 words in each line and of 7 letters in each word. How many letters in the book?

16. A farmer sent 25 loads of wheat to market. Each load consisted of 16 bags, and each bag held 3 bushels. How much did he get for the wheat at $1 per bushel?

17. An agent bought 75 acres of land for $25 an acre, and 136 acres for $31 an acre. He then sold 100 acres for $22 an acre and the remainder for $33 an acre. Did he gain or lose, and how much?

18. Two trains leave the same depot at the same time and go in the same direction. One goes at the rate of 46 miles an hour and the other 29. What distance will they be apart at the end of 13 hours?

19. Find the distance the trains would be apart in the last question if they had gone in *opposite* directions.

20. What did a grocer gain on a barrel of flour which he bought for $5 and retailed at 4 cents per pound?

EXAMINATION PAPER. No. 2.

(Time: 1 Hour. Value of each Question, 10).

1. Find the sum of 8396, 993, 30786, 9504, 8888.

2. Multiply ninety-four million, eighty-seven thousand, forty-six, by seven thousand sixty-eight.

3. From 3700026, take 2701028.

4. Three of four addends whose sum is 1000 are 276, 129 and 544. What is the other?

5. Find the continued product of 21, 25, 19 and 7.

6. Multiply 12 by 8 and subtract 8 from 12, writing the name of each part of the question.

7. John lives 1245 yards from the school house and James 967. How much further would John have to walk in a day than James, both going home to dinner?

8. From the product of 3008 and 80030 take their sum.

9. If 5786 men eat 10,000 boxes of biscuit in 28 days, how long would the biscuit last 1 man?

10. If a merchant buys 48 barrels of flour at $4 a barrel, and 29 barrels at $6 a barrel, and sells it all in one lot at $5 a barrel, what does he gain?

38. ORAL.—Samples for the teacher:

1. What three pieces of money make 7 cents? 11? 12? 15? 16? 21? 25? 27? 30? 31? 35? 36?

2. How many horses can be shod with 12 horse-shoes? With 28? 36? 48? 60? 80? 100?

3. How many eggs in $\frac{1}{2}$ of a dozen? $\frac{1}{3}$ of a dozen? $\frac{1}{4}$? $\frac{1}{6}$?

4. Three boys picked 25 pints of strawberries. John picked 7 pints and George 8 pints. How many quarts did Frank pick?

5. A baker made 20 cakes in the morning and 16 in the afternoon. He sold $\frac{1}{4}$ of them in his shop and sent $\frac{1}{3}$ of them out in the wagon. How many had he left?

6. What can 1 man earn in a day when 4 men can earn $8? When 4 men earn $5? $6? $7?

7. If the length of your book is 6 inches and the length of your desk 40 inches, how many exact lengths of your book in the desk, and how many inches over? If the book is 7 inches long? 8? 9?

8. Name the following:—$\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{7}$, $\frac{1}{8}$, $\frac{1}{9}$, $\frac{1}{10}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$, $\frac{5}{6}$, $\frac{2}{7}$, $\frac{3}{7}$, $\frac{4}{7}$, $\frac{5}{8}$, $\frac{7}{9}$, $\frac{7}{10}$, $\frac{9}{10}$.

9. Let all the pupils write down their estimate of the number of pints the water-bucket will hold. Let one measure and report. Then let each pupil state the number of pints the estimate was greater or less than the correct number.

10. How many times must the glass by the bucket be emptied into the quart measure to fill it?

DIVISION.

37. Division, no less than multiplication, depends on the multiplication table, and it is in connection with the multiplication table it is most easily taught. Very many oral lessons should be given before any written exercise beyond results of one figure is attempted.

Sample lesson :

1. Let the class repeat six times of the table.

2. How many 6's in 6? In 12? 18? 24? 30? 36? 42? 48? 54?

3. How many 6's in 6? In 7? Ans., 1 and 1 over. In 8? Ans., 1 and 2 over. In 9? 10? 11?

4. How many 6's in 12? 13? 14? 15? 16? 17?

[In the next six questions begin with 18, 24, 30, 36, 42, 48 respectively].

11. How many 6's in 54? 55? 56? 57? 58? 59?

12. How many 6's in 0? Ans., 0 and 0 over. In 1? Ans., 0 and 1 over. In 2? Ans., 0 and 2 over. In 3? 4? 5? 15? 34? 44? 59?

Not less than 432 separate questions for the teacher are to be found in the table practice for division. Let the first lesson, oral and written, be confined to 2, the next to 2 and 3, and so on, adding a new number as the pupil becomes familiar with those already used.

38. The sign of division is ÷.

$12 \div 4 = 3$, reads 12 divided by 4 equals 3.

$\frac{12}{4}$ also means that 12 is divided by 4. $\frac{12}{4} = 3$.

$13 \div 5 = 2$ and 3 over, or $13 \div 5 = 2\frac{3}{5}$.

EXERCISE XXVI.

Set down the following expressions and fill in any number wanting in each:

1. $8 \div 2 = (\quad)$.
2. $12 \div 2 = (\quad)$.
3. $18 \div 2 = (\quad)$.
4. $8 \div (\quad) = 4$.
5. $9 \div 3 = (\quad)$.
6. $\frac{12}{3} = (\quad)$.
7. $24 \div 3 = (\quad)$.
8. $15 \div (\quad) = 5$.
9. $20 \div 4 = (\quad)$.
10. $32 \div 4 = (\quad)$.
11. $\frac{28}{4} = (\quad)$.
12. $(\quad) \div 4 = 6$.
13. $35 \div 5 = (\quad)$.
14. $\frac{45}{5} = (\quad)$.
15. $(\frac{30}{5}) = 6$.
16. $(\quad_5) = 8$.
17. $8 + 9 = (\quad)$.
18. $15 - 8 = (\quad)$.
19. $7 \times (\quad) = 42$.
20. $11 \div 3 = 3\frac{2}{3}$.
21. $42 \div 6 = (\quad)$.
22. $(\quad) \div 6 = 9$.
23. $\frac{17}{6} = (\quad)$.
24. $(\frac{25}{6}) = 4\frac{1}{6}$.

EXAMPLE 19.

Divide 138 into sixes.

Dividend.
Divisor. 6)138(23 Quotient.
12
18
18

In 13 there are 2 sixes and 1 over.
In 18 there are 3 sixes.

EXAMPLE 20.

Divide 600525 into *eights*, or by 8.

Dividend.
Divisor. 8)600525(75065$\frac{5}{8}$ Quotient.
56
40
40
52
48
45
40
5 Remainder.

In 60 there are 7 eights and 4 over. But as the 60 is *tens of thousands* the quotient 7 and the remainder 4 are *tens of thousands*. Place the next digit in the dividend on the right of the remainder. In 40 there are 5 *eights* and no remainder. As the 40 is *thousands* the quotient 5 will be *thousands*. Bring down the next digit in the dividend. Then as there are no *eights* in 5 bring down the 2. In 52 there are 6 *eights* and 4 over. The 52 is *tens*, so the quotient 6 and the remainder 4 are *tens*. On bringing down the 5 we get 5 *ones* in the quotient and a remainder of 5 *ones*. This remainder we write $\frac{5}{8}$, called five-eighths.

NOTE.—To prove an exercise in division multiply the *quotient* by the *divisor*, adding in the *remainder*. This ought to give the dividend.

EXERCISE XXVII.

Divide :

1.	$4826 \div 2$.	15.	$777532 \div 4$.	29.	$258063 \div 8$.
2.	$3609 \div 3$.	16.	$739368 \div 6$.	30.	$412737 \div 8$.
3.	$3576 \div 2$.	17.	$865932 \div 6$.	31.	$872905 \div 6$.
4.	$4305 \div 3$.	18.	$578934 \div 3$.	32.	$509384 \div 8$.
5.	$51392 \div 2$.	19.	$134472 \div 4$.	33.	$463070 \div 9$.
6.	$73608 \div 3$.	20.	$253486 \div 6$.	34.	$874081 \div 7$.
7.	$97300 \div 4$.	21.	$708060 \div 5$.	35.	$256918 \div 10$.
8.	$53744 \div 4$.	22.	$839315 \div 5$.	36.	$156467 \div 11$.
9.	$74256 \div 3$.	23.	$856961 \div 7$.	37.	$397692 \div 12$.
10.	$612948 \div 4$.	24.	$176687 \div 7$.	38.	$742687 \div 11$.
11.	$894213 \div 3$.	25.	$978672 \div 8$.	39.	$764896 \div 12$.
12.	$712715 \div 5$.	26.	$274843 \div 8$.	40.	$836919 \div 12$
13.	$832580 \div 4$.	27.	$208278 \div 9$.		
14.	$856716 \div 6$.	28.	$128270 \div 9$.		

These exercises may also be done by Short Division, thus :

EXAMPLE 21. $774806 \div 3$. Divisor. 3)774806 Dividend.

$258268\frac{2}{3}$ Quotient.

7 divided by 3 gives 2 and 1 over. This 1 with the next number in the dividend placed on its right gives 17 ; 17 divided by 3 gives 5 and 2 over. 24 by 3 gives 8 and nothing over. 8 by 3 gives 2 and 2 over. 20 by 3 gives 6 and 2 over. 26 by 3 gives 8 and 2 over which is written $\frac{2}{3}$.

Or thus : 3's in 7, 2 and 1 over. 3's in 17, 5 and 2 over. 3's in 24, 8. 3's in 8, 2 and 2 over. 3's in 20, 6 and 2 over. 3's in 26, 8 and 2 over.

EXAMPLE 22. $581342 \div 9$.

9)581342

$64593\frac{5}{9}$

EXERCISE XXVIII.

Divide :

1. $64842 \div 2$.
2. $832452 \div 2$.
3. $547638 \div 2$.
4. $743852 \div 2$.
5. $936342 \div 3$.
6. $473642 \div 2$.
7. $754376 \div 2$.
8. $456789 \div 2$.
9. $507083 \div 2$.
10. $456789 \div 3$.
11. $725626 \div 3$.
12. $987654 \div 3$.
13. $848532 \div 4$.
14. $648576 \div 4$.
15. $580574 \div 4$.
16. $769308 \div 3$.
17. $672744 \div 4$.
18. $915910 \div 4$.
19. $607120 \div 5$.
20. $712265 \div 5$.
21. $774806 \div 3$.
22. $767822 \div 5$.
23. $728478 \div 6$.
24. $849672 \div 6$.
25. $908544 \div 6$.
26. $870855 \div 6$.
27. $\frac{786355}{4}$
28. $\frac{939834}{5}$
29. $\frac{102752}{6}$
30. $\frac{849884}{7}$
31. $\frac{997095}{7}$
32. $\frac{167026}{7}$
33. $\frac{241657}{7}$
34. $\frac{178584}{8}$
35. $\frac{258600}{8}$
36. $\frac{433963}{8}$
37. $\frac{209178}{9}$
38. $\frac{291096}{9}$
39. $245456 \div 11$.
40. $376020 \div 12$.
41. $572480 \div 11$.
42. $758479 \div 12$.
43. $938026 \div 11$.
44. $995977 \div 12$.

Let the pupils now work by Short Division, all the questions in Exercise XXVII.

EXAMPLE 23. $8)340029$

$42503\frac{5}{8}$

EXAMPLE 24. $9)675026$

$75002\frac{8}{9}$

EXERCISE XXIX.

1. $761257 \div 2$.
2. $975310 \div 2$.
3. $422415 \div 3$.
4. $571528 \div 3$.
5. $562739 \div 4$.
6. $796342 \div 4$.
7. $754366 \div 5$.
8. $795026 \div 5$.
9. $696174 \div 6$.
10. $959448 \div 6$.
11. $739869 \div 4$.
12. $281577 \div 6$.
13. $840372 \div 7$.
14. $283740 \div 7$.
15. $900264 \div 7$.
16. $496052 \div 6$.
17. $462315 \div 7$.
18. $884499 \div 5$.

19. $976504 \div 8$.
20. $256032 \div 8$.
21. $992005 \div 8$.
22. $507820 \div 7$.
23. $552047 \div 8$.
24. $755705 \div 6$.
25. $927364 \div 9$.
26. $378126 \div 9$.
27. $715039 \div 4$.
28. $387299 \div 9$.
29. $949234 \div 5$.
30. $800026 \div 8$.

31. $\frac{104406}{9}$
32. $\frac{593617}{7}$
33. $\frac{888888}{9}$
34. $\frac{777700}{8}$
35. $\frac{666666}{7}$
36. $\frac{800726}{9}$
37. $\frac{528773}{11}$
38. $\frac{507054}{12}$
39. $\frac{700139}{12}$
40. $\frac{951588}{12}$

EXAMPLE 25.

How many oranges at 4 cents each can we buy for 56 cents?

Number of oranges we can buy for 4 cents = 1 orange

" " " 1 cent = $\frac{1 \text{ orange}}{4}$

" " " 56 cents = $\frac{1 \text{ orange} \times 56}{4}$

= 14 oranges

Or thus: Since 4 cents buys an orange, we can buy as many oranges as we have groups of 4 cents. In 56 cents we have $\frac{56 \text{ cents}}{4}$ or 14 groups of 4 cents each; and as each group buys an orange, we can buy 14 oranges.

39. The quotient will always be of the same kind as the dividend.

EXERCISE XXX.

1. How many three-cent stamps can be bought for 93 cents?

2. When apples are selling for $3 per barrel, how many barrels can be bought for $615?

3. A man divided his fortune of $7,614 equally among his 6 children. What was the share of each?

4. How many yards in 5280 feet, 3 feet being equal to 1 yard?

5. How many four-dollar bills would pay a debt of $3468?

6. There are 8 quarts in 1 peck. How many pecks in 80000 quarts?

7. When flour is $6 per barrel, how many barrels can be purchased with $17804?

8. How many four-bushel bags would be needed to hold 5008 bushels of oats?

9. How many half-dozens are there in a barrel containing 294 eggs?

10. How many boxes, each holding 7 bushels, would be required for 80008 bushels of bran?

11. In 1891 there were in Pictou County 34540 people. How many houses would they require allowing 5 to each house?

12. There are 10080 minutes in a week. How many minutes in 1 day?

13. How many tents would be required for a brigade of 6840 men, allowing 1 tent for 8 men?

14. If the number of men in 9 brigades is 69138, what is the average number in each brigade?

15. If a wagon moves forward 11 feet each time the large wheel turns, how often does the wheel turn in going 16896 feet?

16. There are 9 square feet in a square yard. How many square yards in 766167 square feet?

17. How many dozen in 16 boxes of oranges containing 284 each?

40. We found (Example 13) that the same product is obtained when we multiply one number by another, or by the several factors of that other. So, also, in division. The quotient is the same, whether we divide the first number by the second or by the factors of the second.

Example 26. Divide 114075 by 9.

9)114075
12675 Quotient.

3)114075
3)38025
12675 Quotient.

Example 27. 37681 ÷ 49.

7)37681
7)5383
769 Quotient.

Example 28. 666859 ÷ 84.

7)666859
12)95265 sevens and 4 *ones* over.
7938 eighty-fours and 9 *sevens* over.

Proof: $769 \times 49 = 37681$. 9 *sevens* + 4 *ones* = 67. Remainder.

Or by three factors: 3)666859

4)222286 threes and 1 *one* over.

7)55571 twelves and 2 *threes* over.

7938 eighty-fours and 5 *twelves* over.

5 *twelves* + 2 *threes* + 1 *one* = 67. Remainder.

Proof: $7938 \times 84 + 67 = 666859$.

Oral.—If you tie splints 3 in a bundle, and then make piles of 4 bundles in each pile, how many splints will be in each pile? In 7 piles? If you put them first in 7's and then 12 in a pile, how many will be in each pile?

EXERCISE XXXI.

Divide the following, using factors not greater than 12:

(a). 1. 40695 ÷ 15.
2. 48942 ÷ 18.
3. 199416 ÷ 24.
4. 226116 ÷ 27.
5. 244944 ÷ 36.
6. 414792 ÷ 42.
7. 561785 ÷ 63.
8. 576569 ÷ 64.

(b). 9. 666859 ÷ 84.
10. 129570 ÷ 105.
11. 279338 ÷ 125.
12. 564107 ÷ 144.
13. 1277728 ÷ 288.
14. 1060834 ÷ 189.
15. 486994 ÷ 375.
16. 8697462 ÷ 735.

Example 29. Divide 384837 ÷ 900. 900)384837

$427\frac{837}{900}$

Two factors which produce 900 are *100* and *9*. We divide first by 100, and our remainder is 37 *ones*. We then divide by 9, and have a remainder of 5 which is 5 *hundreds*. So our whole remainder is 537.

EXERCISE XXXII.

Divide :

1. 87269 ÷ 100.
2. 783760 ÷ 1000.
3. 751624 ÷ 20.
4. 927870 ÷ 30.
5. 286950 ÷ 40.
6. 771063 ÷ 50.
7. 992863 ÷ 60.
8. 700691 ÷ 90.
9. 730684 ÷ 200.
10. 916041 ÷ 800.
11. 138649 ÷ 700.
12. 666400 ÷ 900.
13. 920006 ÷ 600.
14. 903421 ÷ 110.
15. 716932 ÷ 120.
16. 596872 ÷ 1100.
17. 9172600 ÷ 1200.
18. 3960090 ÷ 12000.

LONG DIVISION.

41. EXAMPLE 30. Dividend.

Divisor. 23)32045(1393 Quotient

23

90

69

214

207

75

69

6—Remainder.

23 into 32 goes 1 time. Set 1 in the quotient; multiply 23 by 1 and subtract, getting 9. Place the next digit in the dividend on the right side of the 9. 23 into 90? If we try 2, and multiply 23 by 2, and subtract from 90, we get a remainder *greater* than our divisor 23, which shows that 23 into 90 will go *more* than 2 times. If we try 4 and multiply, we get a number larger than 90, showing that 23 is not contained 4 times in 90. So we try 3 in the quotient and proceed as before.

We observe that the 32 is *thousands*, and so the 1 in the quotient is *thousands*; also, that the 90 is *hundreds*, making the 3 in the quotient *hundreds*, etc.

EXAMPLE 31.

97)6089140(62774$\frac{62}{97}$

582

269

194

751

679

724

679

450

388

62

EXAMPLE 32.

86)1746396(20306$\frac{76}{86}$

172

263

258

596

516

80

Some teachers find it helpful to have the beginner, before commencing to divide, find the product of the divisor and each digit. Thus: $97\times2=194$. $97\times3=291$. $97\times4=388$. $97\times5=485$. $97\times6=582$. $97\times7=679$. $97\times8=776$. $97\times9=873$. Then, on beginning to divide, a glance at 608 and at 582 would show that 6 would be the first figure required in the quotient, etc.

EXERCISE XXXIII.

Divide :

1. $29616 \div 24$.
2. $42944 \div 32$.
3. $34728 \div 26$.
4. $113741 \div 21$.
5. $72126 \div 34$.
6. $59698 \div 19$.
7. $83207 \div 36$.
8. $565498 \div 43$.
9. $1085857 \div 45$.
10. $533550 \div 25$.
11. $67548 \div 51$.
12. $97201 \div 42$.
13. $753852 \div 56$.
14. $13735224 \div 44$.
15. $124297 \div 53$.
16. $259316 \div 63$.
17. $113517 \div 47$.
18. $104518 \div 74$.
19. $123671 \div 38$.
20. $176429 \div 83$.
21. $\frac{136955}{54}$
22. $\frac{205738}{65}$
23. $\frac{183616}{65}$
24. $\frac{313993}{65}$
25. $\frac{179924}{39}$
26. $\frac{218688}{67}$
27. $\frac{398396}{86}$
28. $\frac{205584}{78}$
29. $\frac{120484}{91}$
30. $\frac{235089}{97}$
31. $217148 \div 35$.
32. $368066 \div 73$.
33. $235578 \div 94$.
34. $526524 \div 87$.
35. $192577 \div 96$.
36. $1511837 \div 49$.

EXAMPLE 33.

$$748)6215367(8309\tfrac{235}{748}$$

5984	
2313	
2244	
6967	
6732	
235	

EXAMPLE 34.

$$6908)415031736(60079\tfrac{6004}{6908}$$

41448	
55173	
48356	
68176	
62172	
6004	

EXERCISE XXXIV.

1. $426587 \div 125$.
2. $876698 \div 241$.
3. $871083 \div 362$.
4. $1405825 \div 275$.
5. $878878 \div 329$.
6. $2057248 \div 436$.
7. $1246799 \div 273$.
8. $2021468 \div 356$.
9. $2844591 \div 419$.
10. $4429799 \div 746$.

11. $\frac{5475684}{612}$ **12.** $\frac{8141957}{832}$ **13.** $\frac{2235747}{723}$ **14.** $\frac{5478156}{684}$

15. $\frac{1595424}{589}$ **16.** $\frac{7014693}{897}$ **17.** $\frac{2478594}{607}$

18. $\frac{5238875}{709}$ **19.** $\frac{2849967}{689}$ **20.** $\frac{4296742}{478}$

21. $8983987 \div 1215$.

22. $19820533 \div 4638$.

23. $7979907 \div 908$.

24. $61157779 \div 8007$.

25. $42109094 \div 6080$.

26. $11799128 \div 9013$.

27. $61157779 \div 7638$.

28. $34496932 \div 8704$.

29. $42109094 \div 7090$.

30. $63923927 \div 9107$.

(b).

31. $31884744 \div 779$.

32. $300422111 \div 8079$.

33. $916872406 \div 9806$.

34. $5678901234 \div 98765$.

35. $1220225290 \div 200563$.

36. $12345678901 \div 234567$.

EXERCISE XXXV.

1. Divide 182 cents equally among 13 boys.

2. Divide 5712 oranges among 14 people.

3. How many days would you require to read a book of 795 pages, reading 15 pages per day?

4. How many feet in 5000 inches?

5. There are 52 weeks in a year. How many years in 47684 weeks?

6. If there are 365 days in a year, how many years in 31390 days?

7. An express train goes 3456 miles in 4 days of 24 hours each. What is the average rate per hour?

8. When horses are selling at auction for $98 each, how many can be purchased for $69188?

9. How many barrels will be required to hold 767516 pounds of flour, 196 pounds being put into each barrel?

10. If 771696 eggs be packed in boxes, putting 868 in each, how many boxes will be required?

11. Into how many farms of 144 acres each can 10368 acres of land be divided?

12. There are 128 cubic feet in one cord of wood. How many cords of wood are there in 138496 cubic feet?

13. The Governor-General of the Dominion of Canada receives a yearly salary of $50000. How much is that a day?

14. A farmer wishes to exchange 150 acres of land worth $24 per acre for woodland worth $18 per acre. How many acres will he get?

15. The number of square miles in the Dominion of Canada is estimated to be 3406542, and the square miles in Nova Scotia 21731. Into how many provinces of the size of N. S. could the Dominion be divided, and how many square miles would be left over?

42. Of the four terms used in division if the *divisor* and *dividend* be given, of course the other two can be found. But to find either divisor or dividend three terms must be given.

EXAMPLE 35.

Dividend.
Divisor. 24)164(6 Quotient.
144
20 Remainder.

To find dividend.

$24 \times 6 + 20$.

24
6
144
20
164

To find divisor

$(164 - 20) \div 6$

20
6)144
24

EXERCISE XXXVI.

1. When the dividend is 75 and the quotient 3, what is the divisor?

2. When the divisor is 88 and the dividend 30000, what is the quotient and remainder?

3. When the quotient is 97 and the dividend 10282, what is the divisor?

4. When the divisor is 67, the quotient 84 and the remainder 53, what is the dividend?

5. When the quotient is 307, the divisor 89 and the remainder 19, what is the dividend?

6. What number divided into 400 will give a quotient of 4 and a remainder of 52?

7. What number will remain when 10,000 is divided by 276?

8. What number must be taken from 10,000 so that it may divide exactly by 276?

9. What number must be added to 200 to make it exactly divisible by 12?

10. The divisor, quotient and remainder are respectively 897, 22 and 266. What is the dividend?

11. The dividend, quotient and remainder are 15000, 21 and 6. Find the divisor.

12. What number, divided by 809, will give a quotient of 92 and a remainder of 576?

43. When several numbers are to be treated as a single number they are placed in parentheses or brackets.

Thus: $(8+4+3)\times 5$ means that $8+4+3$, or 15, is multiplied by 5. So that $(8+4+3)\times 5 = 15\times 5 = 75$.

Again: $(8+12-2)\div(7-4)$ means that $8+12-2$, or 18 is divided by $7-4$ or 3. So our answer is 6.

EXERCISE XXXVII.

SIGNS AND BRACKETS.

1. $(7+4+9)\times 5$.
2. $(30-6)\div(12-4)$.
3. $(5\times 4\times 3)\div(8+7-3)$.
4. $(9\times 9\times 8)\div(18\times 3)$.
5. $72\times(8+9+16)$.
6. $(15+19+48)-(21+8+13)$.
7. $(75-39)\times(47-41)$.
8. $(84\div 4)\div(63\div 9)$.
9. $(83+37)\div(15\times 4)$.
10. $(7\times 6\times 3)-(11\times 3\times 2)$.
11. $(94-13+19)-(77-16+8)$.
12. $(66+77-88)+(99\div 9)$.
13. $(110-2)\div(75-69+6)$.
14. $(87\times 48\times 36)\div(29\times 16\times 12)$.
15. $(906\times 87)-(879\times 89)$.
16. $(17784\div 76)+(26544\div 84)$.
17. $(12\div 3)\times(21\div 7)\times(6\div 2)$.
18. $(96\div 6)\times(19-11)\times(7+5)$.
19. $(88\div 2)\times(27+27-4)$.
20. $(36+12)\times(36-12)\times(36\times 12)\times(36\div 12)$.

EXAMPLE 36.—From the continued product of the sum, product, difference and quotient of 12 and 4, take the difference between 410 and 77.

$$(12+4)\times(12\times 4)\times(12-4)\times(12\div 4)-(410-77).$$
$$=16\times 48\times 8\times 3-333$$
$$=18432-333$$
$$=18099.$$

EXERCISE XXXVIII. (a).

1. What is the sum of the sum and difference of 806 and 297?

2. Find the sum of the product and quotient of 512 and 64.

3. What is the sum of the product, difference and quotient of 69 and 23?

4. What is the continued product of the sum, difference and quotient of 28 and 7?

5. From the difference of 97 and 49 take the quotient of 72 and 4.

6. John had 85 cents, James had 39 more than John and William had 14 less than James. What was the sum of their money?

7. From the continued product of 7, 8 and 9, take the sum of 93, 167 and 49.

8. When the multiplicand is 807 and the product 23403, what is the multiplier?

9. When the minuend is 80060 and the remainder 17906, what is the subtrahend?

10. From the sum of 93, 88, 119 and 187 take the difference 904 and 595.

EXERCISE XXXVIII. (b).

11. What number must be taken from the sum of 274, 98 and 369 to leave the product of 27 and 24?

12. Henry has $44 more than George who has $52. Horace's money is $5 less than the sum of what the other two have. How much money has Horace?

13. What number, multiplied by 93, will equal the product of 279 and 29?

14. What number, divided by 67, equals the quotient of 14688 and 864?

15. What number, multiplied by 9, will give the same product as 7083 multiplied by 29?

16. Find the sum of the five largest numbers that can be expressed by 3, 9, 0, 7.

17. Of what number is 9184, both divisor and quotient?

18. What number must be added 89 times to 850 to give 2897?

19. From the continued product of the sum, product, difference and quotient of 27 and 9, take the sum of the same two numbers.

20. Divide the continued product of the digits, except nought, by their sum.

EXAMINATION PAPER. No. 3.

(TIME: 1 HOUR. VALUE OF EACH QUESTION, 10).

1. There are 36 inches in 1 yard. In 8947 yards, how many inches?

2. In 70020 inches, how many yards?

3. There are 34 pounds in a bushel of oats. A man bought 286 bushels by measure, but each bushel was 5 pounds short of the proper weight. How many pounds did he buy?

4. Divide the sum of 837 and 966 by the difference between 606 and 209.

5. Simplify $(16 - 12) \times (27 \div 9) \times (8 + 3 + 6 + 13 - 22)$.

6. What number must be added to 2498 so that it may be exactly divisible by 301?

7. A farmer gave 17 cows, worth \$24 each, for 136 sheep. What did each sheep cost him?

8. A drover had 60 head of cattle, which cost him \$27 per head, but he lost 6 of them. What must he ask per head for the remainder so as to lose nothing?

9. Construct 13 and 14 times of the multiplication table.

10. Multiply and divide 21978 by 54, using factors.

AVERAGES.

44. If one boy has 10 cents, a second 15, a third 35 and a fourth 12, what is the average number of cents owned by each?

They have 10 cents + 15 cents + 35 cents + 12 cents, or 72 cents altogether. Now, the 72 cents, divided equally among the 4 boys, would give each one 18 cents. The *average* of 10, 15, 35 and 12 is 18. That is, if each boy had 18 cents, the amount owned by the four would be the same.

EXAMPLE 37.

77 sheep.
145 "
117 "
96 "
70 "

5)505 "

101 "

In one pasture there are 77 sheep, in another 145, in another 117, in another 96 and in another 70. What is the average number of sheep in each pasture?

Average number in each pasture.

EXERCISE XXXIX.

1. In a certain school-room there were 35 pupils on Monday, 40 on Tuesday, 42 on Wednesday, 39 on Thursday and 34 on Friday. What was the average attendance each day?

2. The ages of 4 sisters are 8, 10, 13 and 16 years. What is the average age?

3. In the dining-room of an hotel there were 27 people at breakfast, 55 at dinner and 35 at tea. What was the average number at a meal?

4. One basket has 3 dozen and 8 eggs, another 4 dozen and 9, another 2 dozen and 5 and another 2 dozen and 10. What was the average number in each?

5. Of 6 books on a table, one has 458 pages, another 316, the third 400, the fourth 256, the fifth 718 and the sixth 293. What is the average number of pages per book?

6. Find the average of 123, 77, 14 and 29.

7. Find the average of 209, 307, 806, 903, 544, 678 and 212.

8. At an examination, a pupil made a mark of 72 in history, 64 in geography, 47 in grammar, 78 in arithmetic and 56 in drawing. What was the average?

9. In a large school, there are 114 pupils in grade I., 108 in grade II., 98 in grade III., 85 in grade IV., 71 in grade V., 62 in grade VI., 57 in grade VII. and 42 in grade VIII. What is the average number of pupils in each grade?

10. A bicycle rider, in going 5 miles, did the first mile in 127 seconds, the second in 125, the third in 134, the fourth in 148 and the fifth in 132. What was the average time for each mile?

ROMAN NOTATION.

45. Numbers can be expressed not only by words and by figures but also by letters. The method of expressing numbers by letters is called the Roman Notation. In this notation, which is now used only to denote chapters in books, etc., the letters employed are:

I.	Denoting:	one.	C.	Denoting:	one hundred.
V.	"	five.	D.	"	five hundred.
X.	"	ten.	M.	"	one thousand.
L.	"	fifty.			

In writing numbers in *Roman numerals* we *add* to the number expressed by any one of the above letters by placing letters on its right hand side, and we lessen the number which a letter represents by placing a letter of less value on its left.

A bar over a letter increases its value one thousand times. Thus: $\overline{V} = 5000$. $\overline{\overline{M}} = 1000000$.

EXAMPLE 38.

Express 4, 6, 8, 9, 17, 20, in Roman characters.

4 is $5-1$ or IV. 6 is $5+1$ or VI. 8 is $5+3$ or VIII. 9 is $10-1$ or IX. 17 is $10+5+2$ or XVII. 20 is $10+10$ or XX.

EXAMPLE 39.

Express 46, 72, 112, 340, 659, 1111, 2795 in Roman characters.

46 is 50 − 10 + 5 + 1, or XLVI. 72 is 50 + 10 + 10 + 2, or LXXII. 112 is 100 + 10 + 2, or CXII. 340 is 300 + 50 − 10, or CCCXL. 659 is 500 + 100 + 50 + 10 − 1, or DCLIX. 1111 is 1000 + 100 + 10 + 1, or MCXI. 2795 is 1000 + 1000 + 500 + 100 + 100 + 100 − 10 + 5, or MMDCCXCV.

EXERCISE XL.

Write in figures:

1. IV., VII., IX., XXVIII.
2. XVIII., XXXIX., XL., LVI.
3. LI., LXVII., XC., XCIII.
4. DCLXVI., CCCXXX., CDXL.
5. MDCLXVI., MMDIV., DCCCXLIX.

Write in Roman Numerals:

6. 2, 3, 4, 8, 9.
7. 13, 15, 20, 22, 25.
8. 14, 16, 24, 29, 30.
9. 44, 55, 66, 77, 88, 99, 100, 133.
10. 251, 486, 520, 614, 892, 1894, 10000, 100000.

CANADIAN MONEY.

46. In Canada money is counted in *dollars* and *cents*. 100 cents make 1 dollar. Cents are reckoned in *ones* and *tens*, but we do not speak of *hundreds* of cents, for that means dollars.

47. Of copper coins we have one,—the 1-cent piece. Of silver coins we have four,—the 5-cent piece, the 10-cent piece, the 25-cent piece and the 50-cent piece.

48. We have no Canadian gold coin.

49. Two dollars forty-five cents is written $2.45; two dollars is written $2.00: forty-five cents, $0.45; forty cents, $0.40; five cents, $0.05.

EXERCISE XLI.

Write the following in words:

1. $2.45.	**4.** $6.56.	**7.** $9.05.	**10.** $72.07.
2. $3.75.	**5.** $17.25.	**8.** $10.10.	**11.** $39.01.
3. $4.18.	**6.** $26.26.	**9.** $20.08.	**12.** $375.67.

Express in figures:

13. Eight dollars sixty cents.
14. Nineteen dollars nineteen cents.
15. Twenty dollars forty-five cents.
16. Thirty-three dollars eighty-six cents.
17. One thousand dollars.
18. One hundred dollars ninety cents.
19. Six hundred four dollars four cents.
20. Thirty thousand thirty dollars thirty cents.

ADDITION.

50. Dollars and cents are added, etc., like ordinary numbers, care being taken to keep the point which separates dollars from cents in its proper place.

EXAMPLE 40.

Add $254.07, $63.90, $800.00, $17.06, and $904.10.

$254.07
63.90
800.00
17.06
904.10
$2039.13

EXERCISE XLII.

Add:

1.	**3.**	**5.**
$8.25	$775.14	$10500.00
9.02	806.90	9064.83
7.68	10.75	7586.44
5.50	909.22	900.00
		77.25
2.	**4.**	**6.**
$930.26	$8060.60	$94680.35
854.95	704.15	94712.19
715.08	93.68	6984.10
83.30	7400.00	37004.48
	917.17	890.00

7. A boy paid $10.75 for a suit of clothes, $8.40 for an overcoat, $1.25 for a hat, $2.35 for boots, and $0.65 for gloves. What was the cost of the whole outfit?

8. A lady, when out shopping, paid $5.60 for a hat, $1.45 for gloves, $12.85 for cashmere, $8.67 for velvet, $0.23 for spools, and $1.08 for ribbon. What was the amount of her bill?

9. A young man saved, in one week, two dollars seven cents, in another two dollars thirty, in another one dollar ninety-five, and in another three dollars. How much did he save in the month?

10. A man paid $145 for a horse, $112 for a wagon, $26.75 for harness, one dollar thirty-five cents for a whip, and two dollars and a-half for a knee-rug. What did he pay for the outfit?

MULTIPLICATION.

50. EXAMPLE 41.

$715.45
9
$6439.05

EXAMPLE 42.

$827.05
678
661640
578935
496230
$560739.90

EXERCISE XLIII.

Multiply:

1. $807.25 × 8.
2. $750.20 × 9.
3. $1086.46 × 12.
4. $681.55 × 37.
5. $7658.35 × 68.
6. $8008.50 × 97.
7. $6809.08 × 346.
8. $9487.63 × 578.
9. $10700.40 × 809.
10. $87601.01 × 817.

11. What is the cost of 9 yards of cloth at $1.18 per yard?

12. What does a farmer get for a tub of butter weighing 36 pounds at $0.23 per pound?

13. What would a farmer get for 9 tubs of butter, each weighing 31 pounds, at 24 cents per pound?

14. What would a web of 197 yards of cloth be worth at 86 cents per yard?

15. What is the value of 13 webs of cloth each containing 148 yards at $1.15 per yard?

16. A farm of 89 acres was bought at $8.75 per acre What was paid for it?

17. A farmer sold 18 pounds of fresh butter at 26 cents per pound, 2 dozen heads of cabbage at 6 cents per head, 11 bushels of potatoes at 65 cents per bushel, and 12 dozen of eggs at 22 cents per dozen. How much did he get for all?

18. A farmer hauled 8 loads of wheat to market, taking an average of 12 sacks holding 3 bushels each at each load. He sold the wheat for 66 cents per bushel. How much did he get?

19. If a man earns $18.65 per week how much does he earn in a year?

20. If a man earns $2.65 on each week day, what does he earn in a year?

SUBTRACTION.

51. EXAMPLE 43.

$$\begin{array}{r} \$10240.04 \\ 7008.65 \\ \hline \$3231.39 \end{array}$$

EXERCISE XLIV.

1. From $87.50 take $39.75.
2. From $100.00 take $88.21.
3. From $910.10 take $17.05.
4. From $1004.26 take $870.30.
5. From $2675.08 take $1386.80.
6. From $80060.01 take $7714.05.
7. From $10000.00 take $9099.45.
8. From ten thousand dollars take eight thousand eighty-eight dollars fifty-four cents.

9. A man to whom a debt of $871.15 was owing was able to collect only $609.50. How much did he lose?

10. A man who built and furnished a house at a cost of $2159.47, sold it for $2400. What did he gain?

DIVISION.

52. EXAMPLE 44. Divide $44165.66 into 7 equal parts.

7)$44165.66

$6309.38

EXAMPLE 45. When apples are $2.45 per barrel how many barrels can be purchased for $56.35?

2.45)$56.35(23

49 0

735

735

Here we find that in $56.35 the price of 1 barrel, $2.45, is contained 23 times. Hence we can buy 23 barrels.

NOTE.—In exercises like the above the pupil must be careful to have the same number of figures on the right hand side of the point which divides dollars from cents in both divisor and dividend.

EXERCISE XLV.

1. Divide $320.35 into 5 equal parts.
2. Divide $800.10 into 6 equal parts.
3. Divide $2743.06 into 7 equal parts.
4. Divide $12104.25 into 8 equal parts.
5. Divide $402.04 into 46 equal parts.
6. Divide $65099.16 into 763 equal parts.
7. Divide $140694.99 into 597 equal parts.
8. If $125.10 is divided among 9 persons what sum will each get?
9. An estate valued at $11068.75 was left to a family of 8 children. What was the share of each?
10. If the cost of building 29 miles of railway is $263476.40, what is the average cost per mile?
11. When butter is worth $0.24 per pound, how many pounds can be bought for $12.96?
12. How many chairs, at $1.65 each, can be purchased for $28.05?

EXERCISE XLVI.

MISCELLANEOUS.

1. How much money would be required to pay 8 men for one week, at $1.45 per day?

2. How many pounds of tea, at 45 cents per pound, can be had for 9 dozen eggs at 15 cents per dozen?

3. A man sold a horse for $113.50, and a wagon for $81.75. After paying bills to the amount of $106.86, how much had he left?

4. A farmer sold 3 cows at $22.50 each, 16 sheep at $3.35 each, and a horse for $120. He then bought a wagon for $110, and 48 yards of Brussels carpet at $1.85 per yard. How much money had he left?

5. A merchant bought three chests of tea, of an average weight of 112 pounds, for 22 cents per pound, and sold the lot at 30 cents per pound. What was his gain?

6. A lady who bought 18 yards of dress goods at $0.85 per yard, and trimmings costing $4.17, paid $10.45. How much was still owing?

7. A man sold 5 lots in a city for $275.25 each, and invested the money in a farm of 75 acres. What did the land cost him per acre?

8. A man goes into a grocery store with a twenty-dollar bill. He buys a barrel of flour at $6.20, a barrel of cornmeal for $3.35, 4 pounds of tea at 35 cents per pound, 18 pounds of butter at 24 cents per pound and 3 dozen eggs at 20 cents a dozen. What change ought he to get?

9. A man bought 37 acres of land for $800. He spent $350 in improving it, and then sold 20 acres at $35 per acre and the rest at $32. What did he gain?

10. When flour is $5.35 per barrel, how many barrels can be purchased for $379.85?

11. A farmer gave 3 tons of hay worth $12.50 per ton, a cow worth $25, and 50 pounds of butter for a $75 mowing machine. How much was he allowed per pound for the butter?

12. A drover bought 12 head of cattle at $17.50, 7 at $22 and 9 at $24.40. At what average price must he sell them so as to gain $88.40?

13. Bought a chest of tea for $35.20 and sold half of it for $22 at the rate of 40 cents per pound. What was the weight of the chest, and what price per pound did I pay?

14. Bought a flock of 115 sheep for $373.75 and sold 87 of them at $3.60 apiece and the rest at cost. What was the gain?

15. A shopkeeper's receipts on Monday were $354.51, on Tuesday $360.40, on Wednesday $402.12, on Thursday $375.08, on Friday $284.36 and on Saturday $529.87. What was the average amount taken each day?

EXAMINATION PAPER. No. 4.

(TIME: 1 HOUR. VALUE OF EACH QUESTION, 10).

1. What number increased by the difference between 5004 and 2806 will equal the sum of 2086, 977, 2986 and 809.

2. How many pounds of coffee at 28 cents can be bought for $11.76?

3. There are 1728 cubic inches in 1 cubic foot. Find how many cubic feet in 7560000 cubic inches?

4. Multiply together the numbers expressed by LXXXIX. and XIV., and give the product in Roman characters.

5. Add one cent; four thousand dollars four cents; three hundred three dollars three cents, and multiply their sum by 49.

6. A cubic foot of water weighs 1000 ounces. How many pounds of 16 ounces each in a cubic foot of water?

7. A man went into business at the age of 25, and retired at the age of 66 with a fortune of $35442.45. How many dollars did he save each year on an average?

8. A grove of 5586 maple trees is to be thinned by having every seventh tree cut down. How many will be left?

9. The circumference of the earth at the equator is 24898 miles. In how many hours would a railway train moving 36 miles per hour travel such a distance?

10. What can be saved in a year by a man who earns $500, and who pays $3.75 a week for board and $4.40 a week for clothing and other expenses?

BILLS OF GOODS.

53. *A Bill of Goods* is a written statement of goods sold, giving dates, quantities and prices.

54 *A Statement of Account* is a written statement of the total sums due according to bills previously rendered.

55. One to whom a debt is owed is called the *Creditor*, and one who owes a debt is called the *Debtor*.

SPECIMEN OF A BILL OF ITEMS.

St. John, May 1, 1894.

Mr. Robert Ross,

Bought of DEARBORNE & CO.

1894.				
April.	3	15 lb. Java Coffee.....@ 35c.	$5	25
		10 lb. Mocha " .....@ 45c.	4	50
		7 lb. Cream of Tartar.....@ 32c.	2	24
	11	9 lb. Tea .....@ 34c.	3	06
		6 packages "Peerless" Ginger.....@ 11c.		66
		1 Box "Surprise" Soap.....	4	75
			$20	46

SPECIMEN OF A RECEIPTED BILL WITH CREDIT ITEMS.

HALIFAX, N.S., May 15, 1894.

MR. THOMAS FORBES,

Bot. of T. C. ALLEN & CO.

1894						
April	2	12 copies Shakspeare (Morocco).....@ $1.25	$15	00		
		10 qr. Note Paper....@ .25	2	50		
		5 pkgs. Envelopes..@ .08	...	40		
		2 boxes Pens.....@ .35	....	70		
		1 bottle Ink.....	....	40		
	9	3 reams Foolscap...@ 3.15	9	45	$28	45
		Less				
		3 chaldrons Sydney Coal ..... @ 5.25	15	75		
		2 tons Hard Coal (Nut) ..... @ 3.20	6	40	22	15
					$6	30

Received payment, June 3, 1894.

T. C. ALLEN & CO.,

Per HARRY POWELL.

SPECIMEN OF STATEMENT OF ACCOUNT RECEIPTED.

CHARLOTTETOWN, June 2, 1894.

MESSRS. CREIGHTON & CONGDON,

To STEWART & GATES, DR.

1894				
June	12	To account rendered.....	$29	65

Received payment, June 18. 1894.

STEWART & GATES,

Per D. A. F.

EXERCISE XLVII.

Make out bills for the following accounts, supplying places and dates where these are not given :

1. P. J. Grant, Pictou, bought of A. M. Bell, Feb. 27, 1894, 60 lbs. 3-inch nails, @ 4c.; 150 lbs. shingle nails, @ 5c.; 2 dozen door hinges, @ $1.05 per dozen; 3 dozen small cans paint, @ $1.25 per dozen.

2. Crofton Dickie bought of W. H. Cawsey & Co., March 12, 1894, 12 lbs. sugar, @ 6c.; 3 lbs. tea, @ 32c.; 5 lbs. butter, @ 24c.; 4 lbs. beefsteak, @ 13c.; 3 lbs. cheese, @ 16c.; 18 lbs. pork ham, @ 12c.

3. W. E. Thompson, bought of Colwell Bros., 1 Melissa coat, @ $16.75 ; 2 all-wool shirts, @ $1.75 ; 1 silk umbrella, $4.25 ; 1 walking cane, $0.90 ; one-half dozen linen handkerchiefs, @ $0.27 each. Make out receipted bill.

4. Miss Jessie McIntosh bought of McPherson & Freeman, 1 pair kid gloves, @ $1.40 ; 13 yards Muslin, @ $0.18 ; 8 yards lace, @ $0.15 ; 9 yards dress serge, @ $0.75 ; 5 yards lining, @ $0.18 ; 2 yards canvas, @ $0.20 ; 2 dozen buttons, @ $0.25 per dozen ; 2 spools silk, @ $0.05 ; 1 spool twist, @ $0.06.

5. Miss Mary Chisholm bought of Barnstead & Sutherland, Halifax, June 6, 1894, 12 yards black silk, @ $1.45; 9 yards flannel, @ 40c.; 2 pairs silk gloves, @ 65c.; 11 yards ribbon, @ 17c.; 4 crash towels, @ 45c.; 2 linen table-cloths, @ $2.25 ; 1 chenille table-cover $4.50.

6. May 15, 1894, Duncan Grant, bought of R. McGregor & Sons, 25 bbls. flour, @ $4.35 ; 18 bbls. rolled oats, @ $4.85 ; 9 bbls. kiln-dried cornmeal, @ $3.30 ; 1 chest tea weighing 115 lbs., @ 28c.; 3 bbls. brown sugar, each 268 lbs., @ 4c.; 1 bbl. granulated sugar weighing 273 lbs., @ 6c. per lb.

7. G. J. Ross, bought of Isaac Creighton, March 12, 1894, 7 lbs. roast beef, @ 12c.; 3 bushels potatoes, @ 65c.; 3 bottles pickles, @ 25c.; 4 cans corn, @ 17c.; March 14, 6 lbs. beef steak, @ 13c.; 2 bunches celery, @ 7c.; 6 lbs. sugar, @ 7c.; 3 lbs. coffee, @ 35c.; 1 package Peerless

pepper, @ 8c.; March 16, 9 lbs. roast beef, @ 12c.; 3 heads cabbage, @ 8c. On March 15, paid $2, and balance on March 19. Make out bill accordingly.

8. Messrs. Layton & Co., purchased of Smith Bros., bills as follows: March 1, $94.65; March 29, $80; April 18, $104.40; April 25, $63.25; May 2, $26.75. Draw up a statement of these bills, dated May 5, and receipt it (May 8) on behalf of Smith Bros.

9. Frank Eden bought of Cragg Bros., May 3, 5 doz. coat-hooks, @ 40c.; 5 door knobs, @ 15c.; 3 rack pulleys, @ 45c. May 7, 25 lbs. cut nails, @ 4c.; 5 door locks, @ 55c.; 9 doz. screws, @ 10c.; 3 padlocks, @ 27c.; 1 brass chain, 65c.; 2 sets of fire-irons, @ $2.45. Frank Eden sold Cragg Bros., May 5, 1 pair boots, @ $4.15; 1 pair rubbers, 60c.; 2 pairs slippers, @ 75c. Credit these items on bill and receipt it, the balance being paid May 10.

10. Alex. Grant, sold James W. Fraser, June 14, 12 lbs. tea, @ $0.28; 25 lbs. granulated sugar, @ $0.06; 4 lbs. sole leather, @ $0.32; 2 pairs shoes, @ $1.85; 15 lbs. hemp rope, @ $0.22; 2 bbls. flour, @ $4.65. On June 14, Alex. Grant got from James W. Fraser 23 lbs. of butter, @ $0.20, and on June 21 a 45 lb. tub at the same rate. The balance was paid in cash on June 21. Make out bill.

UNITARY METHOD.

56. If 3 oranges cost 12 cents what will 5 cost?

The natural method of solving a question of this kind, and the one which the mind of a child will invariably adopt, is to find the price of *one* article and, using that as a fresh starting point, find the value of the number required.

Thus:

EXAMPLE 46. Cost of 3 oranges = 12 cents.

" 1 orange = $\frac{1}{3}$ = 4 cents.

" 5 oranges = 4 cents × 5 = 20 cents.

EXAMPLE 47.—If 6 bushels of wheat are worth \$9.75 what are 37 bushels worth?

Value of 6 bushels of wheat = \$9.75

" 1 bushel " = $\frac{\$9.75}{6}$

" 37 bushels " = $\frac{\$9.75 \times 37}{6}$

= $\frac{\$360.75}{6}$ = \$60.12+

EXERCISE XLVIII.

1. If 6 pounds of sugar cost 30 cents, what will 11 pounds cost?

2. When 4 quarts of salt can be bought for 12 cents, what must be paid for 13 quarts?

3. When apples are selling at 15 cents per dozen what would 20 apples cost?

4. A girl paid 69 cents for 23 peaches. How much was that per dozen?

5. What will 7 pounds of tea cost when 13 pounds cost \$4.16?

6. When \$84.75 is paid for 15 barrels of flour what is the value of 9 barrels?

7. A man who had 8 chaldrons of Sydney coal put into his cellar, paid \$46.80 for it. What would he have had to pay for 13 chaldrons?

8. If 14 acres of land cost \$61.60, what would 1 square mile (640 acres) cost?

9. If 3 men can earn \$22.50 in a week, what can 50 men earn?

10. 27 men can thresh 450 bushels of oats in a day. How many bushels could 9 men thresh?

11. The man who works 8 hours a day, works 28800 seconds. How many seconds *more* does the man work who is employed 10 hours a day?

12. A railway train that travelled from St. John to

Halifax, 275 miles, in 550 minutes, would require how many minutes to go from Truro to New Glasgow, 43 miles?

13. A lady paid $22.95 for 17 yards of silk, but finding that she had not enough, she sent a girl with a $5 bill for 3 yards more. What change ought the girl to bring back?

14. A train that can run from Halifax to Sydney, a distance of 214 miles, in 321 minutes (5 hours 21 minutes), would require what time to travel from Halifax to Quebec, a distance of 674 miles?

15. How far would a man, who can walk 10 miles in 3 hours, walk in 15 days, travelling 10 hours a day?

16. When 3 gallons of molasses cost $1.65, what would a tierce containing 42 gallons cost?

17. What would it cost to carpet a room having an area of 26 square yards, with carpet costing $1.85 per square yard?

18. If the cost of carpeting a room containing 29 square yards is $37.70, how much money would pay for similar carpet for a room of 21 square yards?

19. A farmer, who has a herd of 17 Jersey cattle, of equal value, offers 3 of them for $102.75. What is the value of the whole herd?

20. A farmer sold an 8-pound tub of butter for $1.96. What would he get for 4 tubs of the same quality, containing 33 pounds each?

EXAMPLE 48. If 15 men dig a trench in 24 days, how many men could dig it in 8 days?

Men required to dig the trench in 24 days = 15 men.
" " " " 1 day = 15 men × 24
" " " " 8 days = $\frac{15 \text{ men} \times 24}{8}$ = 45 men.

EXAMPLE 49.

If 15 men can dig a trench in 24 days, in how many days can 45 men dig it?

Time required for 15 men to dig the trench = 24 days.
" " " 1 man " " " = 24 days × 15
" " " 45 men " " " = $\frac{24 \text{ days} \times 15}{45}$ = 8 days.

EXERCISE XLIX.

1. If 9 boys can pick the plums in an orchard in 16 days, how many boys could pick them in 24 days?

2. If 7 girls can pick the strawberries in a certain garden in 9 days, how many girls can pick them in 3 days?

3. 30 horses can haul the brick for a new building in 18 days. How many horses would be required to do the work in 20 days?

4. If 12 men can plough a field in 11 days, how many men could plough it in 4 days?

5. If 3 men can dig a cellar in 13 days, how many men would be required to dig it in 3 days?

6. If 5 men can dig a trench in 12 days, in how many days can 20 men dig it?

7. When 32 masons can build a wall in 27 days, in what time could 18 masons build it?

8. If 450 workmen can grade a line of railway in 32 days, in how many days can 300 men grade it?

9. How long will 13 men require to do a piece of work which takes 19 men 91 days?

10. In how many days could 23 men clear a piece of rough land which took 11 men 46 days to clear?

11. If 9 printers can set up the type of a book in 50 days, how many printers could set it up in 18 days?

12. If 16 looms weave 10000 yards of cotton in 15 days, how many looms would produce the same number of yards in 5 days?

13. If 10 men can build half of a wall in 33 days, in what time can 30 men finish it, that is, do the same amount of work?

14. After 125 men had been throwing up a rampart for 28 days it was found to be half done. A detachment of 50 men were then sent to their assistance. In how many days from the arrival of these men will the wall be finished?

15. When 25 pounds of tea are bought for $9.25, what must be paid for 17 pounds of the same quality?

16. When \$28.35 is paid for 9 barrels of cornmeal, what will 43 barrels cost?

17. If 28 men can build a house in 13 days, now many more men must be hired so that a second house of the same kind may be built in 7 days.

18. A contractor has 45 teams hauling stone for a railway bridge. At the end of 21 days the work is half done and 10 of the teams go to work elsewhere. In how many days more will the stone be hauled.

19. When oranges are worth \$0.35 a dozen, what will 19 oranges cost?

20. If 35 men can cut 490 cords of wood in 7 days, in how many days can they cut 700 cords?

EXAMPLE 50. When 7 barrels of rolled oats can be bought for \$34.65, how many can be bought for \$133.65?

Number of bbls. which can be bot. for \$34.65 = 7 barrels.

" " " " " \$1.00 = $\frac{7}{34.65}$ "

" " " " " \$133.65 = $\frac{7 \times 133.65}{34.65}$ = 27 barrels.

EXERCISE L.

1. When 5 yards of cloth can be bought for \$4.25, how many yards can be bought for \$16.15?

2. If 11 men can be hired a day for \$15.95, how many can be hired for \$34.80?

3. If 47 pounds of sugar cost \$2.82, how many pounds could be purchased for \$14.10?

4. How many pecks of plums can be bought for \$24.15, when \$17.25 buys 15 pecks?

5. When \$2.38 will buy 17 cans of tomatoes, how many cans will \$4.20 buy?

6. If a railway ticket from Charlottetown to Georgetown, 46 miles, costs \$1.38, what ought a ticket cost from Charlottetown to Tignish, 117 miles?

7. A man who invests \$179.80 in land gets 31 acres. How many acres could he buy at the same rate for \$539.40?

8. A man who pays \$930 for land, buys at same rate as a neighbor who got 70 acres for \$651. How many acres does he buy?

9. If 4 yards of canvas can be bought for \$0.86, how many yards can be bought for \$2.15?

10. If 18 yards of calico can be purchased for \$1.35, how many will \$0.45 purchase?

11. When \$17.50 will buy 50 pounds of coffee, how many pounds will \$2.45 buy?

12. When a farmer gets \$3.99 for a tub of butter weighing 19 pounds, how many pounds must he give to pay a bill of \$9.24?

13. If a return ticket from Halifax to Truro, 62 miles, costs \$2.79, what must be the distance between Halifax and Moncton, where a return ticket at the same rate would cost \$8.37?

14. If 3 chests of tea, each weighing 67 pounds, cost \$52.26, what will 8 chests, each weighing 69 pounds, cost?

15. When \$2.80 buys 21 cans of peaches, at what rate per dozen are the cans selling?

16. If 27 men can build a bridge in 25 days, in what time could 15 men build a similar one?

17. If 75 soldiers can be supplied with new boots for \$251.25, how many could be supplied for \$804?

18. When 23 tons of hay bring \$546.25, how many tons will pay a debt of \$166.25?

19. If 204 men do a piece of work in 35 days, how many men would be required to do it in 420 days?

20. When 13 barrels of flour can be bought for \$57.85, how many barrels can be bought for \$431.65?

EXAMINATION PAPER. No. 5.

(TIME: 1 HOUR. VALUE OF EACH QUESTION, 10.)

1. From 400500 take the product of 264 and 809.

2. Divide 5643897 by 4064.

3. What number must be added to the difference between 83 and 59 to make 100?

4. Find the average of 35, 72, 88, 63, 55 and 29.

5. If half a dozen dozen peaches can be bought for $1.08, what will six dozen dozen cost?

6. What was the value of a prize, divided equally among 342 sailors, when the 7 men from Yarmouth got $399?

7. Multiply 2646 by 48 and divide the product by 27, using factors not greater than 4.

8. A merchant bought 685 barrels of flour, at $4.62 per barrel, and after paying 27 cents freight per barrel, he sold for $5.10 per barrel. What was his gain?

9. If $34.72 will buy 16 yards of silk, how many yards in a web of the same quality for which $484 has been paid?

10. D. A. Fraser bought of H. P. Bezanson half a dozen linen collars @ $0.25 each; 3 dress shirts @ $1.45 each; half a dozen cuffs @ $0.30 each; 2 neckties at $0.65 each; 1 fur hat @ $2.75, and 1 silk handkerchief @ $1.20. Make out receipted bill for the above, filling in date and place at which you write.

EXAMINATION PAPER. No. 6.

(TIME: 1 HOUR. VALUE OF EACH QUESTION, 10.)

1. Find the product of the sum and difference of thirty-six thousand and nineteen and one thousand and one.

2. Divide 5806896684 by 9678.

3. The minuend in an exercise in subtraction is 1001036 and the remainder 1129. What is the subtrahend?

4. When $400.50 is divided among 25 persons, what is the share of each?

5. If 17 oranges are worth 87 apples, for how many apples can I exchange 850 oranges?

6. Make out the bill for the following, supplying place and date: 7 yards of Scotch tweed, @ $1.85; 5 yards of blue pilot, @ $3.65; 9 yards Canadian tweed, @ $1.15; 11 yards Oxford gray, @ $0.90, and 27 yards silk binding, @ $0.13.

7. A boy worked for a farmer 10 days, receiving $0.35 the first day, with an increase of $0.05 each day. What was the amount of his earnings and the average for each day?

8. If 36 yards of lawn cost $8.28 what will 97 yards cost?

9. When 4 dozen pairs of gloves are bought for $55.68, how many pairs can be bought for $63.80?

10. The sum of three numbers is 400. The first two are equal, and the third is equal to the sum of the first and second. What are the numbers?

ANSWERS.

Exercise I.—(Page 9).—1. Seven. 2. Eleven. 3. Seventeen.
4. Twenty-six. 5. Thirty-three. 6. Forty-eight. 7. Fifty-nine.
8. Sixty-six. 9. Seventy. 10. Eighty-three. 11. Ninety-nine.
12. One hundred twenty-five. 13. One hundred sixty-eight.
14. One hundred thirty. 15. One hundred seventeen.
16. One hundred ten. 17. One hundred seven.
18. Four hundred forty-four. 19. Seven hundred nine.
20. Nine hundred eleven. 21. 80. 22. 91. 23. 106. 24. 240.
25. 377. 26. 619. 27. 911.

Exercise II.—(Page 10).—1. 15. 2. 15. 3. 16. 4. 17. 5. 21.
6. 17. 7. 20. 8. 22. 9. 22. 10. 27. 11. 33. 12. 27. 13. 39.
14. 31. 15. 26. 16. 258. 17. 309. 18. 338. 19. 299. 20. 239.
21. 989. 22. 789. 23. 999. 24. 858. 25. 35. 26. 42. 27. 51.
28. 51. 29. 46. 30. 44.

Exercise III.—(Page 12).—1. 95 cents. 2. 157 apples.
3. 29 eggs. 4. 139 dollars. 5. 59 days. 6. 122 days. 7. 184 days.
8. 219 sheep. 9. 398 feet. 10. 648 yards. 11. 196. 12. 998.

Exercise IV. (a).—(Page 16).—1. Three hundred ten.
2. Nine hundred six.
3. Three thousand, one hundred seventy-two.
4. Four thousand, eight hundred seventy-seven.
5. Eight thousand, nineteen.
6. Seven thousand, thirty-three.
7. Seven thousand, five hundred six.
8. Four thousand, four hundred four.
9. Nine thousand, five.
10. One thousand, one.
11. Thirty-two thousand, seven hundred forty-eight.
12. Twelve thousand, four hundred nine.
13. Fifty-eight thousand, six hundred four.
14. Forty-seven thousand, eighty.
15. Ninety thousand, six hundred thirty.
16. Seventy thousand, two hundred six.
17. Eighty-six thousand, five.
18. Six hundred twenty-three thousand, seven hundred fifteen
19. One hundred four thousand, four hundred one.
20. Three hundred eight thousand, thirty.
21. Seven hundred sixty thousand, twenty-five.
22. Nine hundred thousand, eight hundred forty-three.
23. Seven hundred ten thousand, six.
24. One hundred ninety thousand, one hundred ninety.

Exercise IV. (b).—(Page 16).—1. Eight thousand, eighteen.
2. Seven hundred one thousand, three.
3. Six hundred fifty thousand, ten.
4. Six hundred thousand, seven hundred.
5. Eight hundred thousand, one hundred nineteen.
6. Seven million, sixteen thousand, one hundred thirty.
7. Seven million, one hundred thousand, eight hundred.
8. Six million, one hundred thirty thousand, forty-nine.
9. Nine million, nine.
10. Eight million, three hundred seventy-two thousand, six hundred ninety-four.
11. One million, twenty-thousand, three hundred four.
12. Seventy million, eight hundred six thousand, nine hundred ten.
13. One billion, one hundred eleven million, one hundred eleven thousand, one hundred eleven.
14. Nine billion, nineteen.
15. Three quadrillion, two hundred trillion, seventy billion, five hundred million, seven hundred thousand.
16. Six trillion, four hundred seventy-three billion, eight hundred fifty-one million, nine hundred twenty-seven thousand, three hundred sixty-four.
17. One billion, three hundred million, thirteen thousand, thirteen.
18. Seven quadrillion, one trillion, ten billion, two hundred million, five thousand, fifty.

Exercise V. (a).—(Page 16).—1. 209. 2. 818. 3. 3492.
4. 7820. 5. 4057. 6. 6104. 7. 5006. 8. 24685. 9. 70419.
10. 550 0. 11. 236191. 12. 775000. 13. 800008. 14. 200202.
15. 330011.

Exercise V. (b).—(Page 17).—1. 1687914. 2. 3013. 3. 3014004.
4. 7000770. 5. 50500045. 6. 472000001. 7. 807605403.
8. 90900900. 9. 212011050. 10. 3204113516. 11. 49720004000€.
12. 6896710190712. 13. 700070007060500. 14. 9040004800019105.
15. 90000000900000009. 16. 201000010000010000.

Exercise VI.—(Page 19).—Last result in each: 1. 12. 2. 24.
3. 36. 4. 48. 5. 60. 6. 72. 7. 84. 8. 96. 9. 108. 10. 120.
11. 79. 12. 82. 13. 91. 14. 94. 15. 78. 16. 81. 17. 75.
18. 83. 19. 100. 20. 102. 21. 93. 22. 105. 23. 86. 24. 132.
25. 144.

Exercise VII. (a).—(Page 21).—1. 127. 2. 248. 3. 171.
4. 238. 5. 204. 6. 205. 7. 209. 8. 264. 9. 223. 10. 314.
11. 318. 12. 322. 13. 1889. 14. 1602. 15. 1962. 16. 1368.
17. 2172. 18. 2412. 19. 2369. 20. 2915. 21. 16708. 22. 20162.
23. 10317. 24. 22969. 25. 39836. 26. 32486. 27. 27973.
28. 23772. 29. 421117. 30. 401364. 31. 308803. 32. 335645.

Exercise VII. (b)—(Page 22).—1. 3232615. 2. 1418401.
3. 1037995. 4. 1858593. 5. 9679924. 6. 8474700. 7. 17034545.
8. 13818628. 9. 19659421568. 10. 29974430849989766.

Exercise VIII.—(Page 23).—1. 399. 2. 2253. 3. 3901.
4. 20580. 5. 41562. 6. 29159. 7. 22226. 8. 96451. 9. 163733.
10. 51668. 11. 59935. 12. 422812. 13. 169302. 14. 224163.
15. 8784625. 16. 8853680. 17. 23640275. 18. 10938567.
19. 1584267081. 20. 8938285777553134.

Exercise IX.—(Page 25).—1. 440 pages. 2. 365 days.
3. 691 dollars. 4. 355 sheep. 5. 984 miles. 6. 316 trees.
7. 23532 trees. 8. 11174 dollars. 9. 23533 cattle. 10. 86854.
11. 36914. 12. 114751. 13. 363542. 14. 109078. 15. 321263.
16. 4833239.

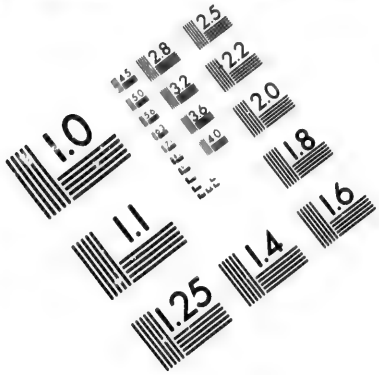
Exercise X.—(Page 29).—1. 42862. 2. 62862. 3. 80684.
4. 124268. 5. 93069. 6. 159306. 7. 273396. 8. 249360.
9. 168608. 10. 210936. 11. 288 pens. 12. 168 pupils.
13. 1648 dollars. 14. 1648 cents. 15. 1288 apples. 16. 1028 pages.
17. 3208 pages.

Exercise XI.—(Page 31).—1. 192648. 2. 147852. 3 174592.
4. 183476. 5. 185487. 6. 223554. 7. 253917. 8. 212418.
9. 245496. 10. 187060. 11. 264831. 12. 190700. 13. 185845.
14. 300436. 15. 198240. 16. 281571. 17. 408282. 18. 463758.
19. 305778. 20. 499494. 21. 237224. 22. 259084. 23. 499982.
24. 399637. 25. 490434. 26. 651602. 27. 265776. 28. 326816.
29. 545202. 30. 319746. 31. 415968. 32. 650069. 33. 602592.
34. 770264. 35. 575488. 36. 233096. 37. 567405. 38. 744444.
39. 483732. 40. 834165. 41. 372680. 42. 651376. 43. 917664.
44. 764368. 45. 447372. 46. 753996. 47. 871623. 48. 1015884.

Exercise XII. (a).—(Page 32).—1. 294476. 2. 406259.
3. 655416. 4. 635751. 5. 325248. 6. 461748. 7. 254524.
8. 487448. 9. 84594. 10. 474890. 11. 265869. 12. 516736.
13. 142413. 14. 622162. 15 688308. 16. 395208. 17. 465984.
18. 184704. 19. 563844. 20. 652152. 21. 540586. 22. 434496.
23. 697320. 24. 505342.

Exercise XII. (b).—(Page 32).—1. 47671145. 2. 47153104.
3. 50223348. 4. 30000906. 5. 55571882. 6. 17239656. 7. 92583676.
8. 297629145. 9. 243452262. 10. 341603638. 11. 185640906.
12. 281757000. 13. 554049624. 14. 617992037. 15. 388430268.
16. 97406784. 17. 1923341164. 18. 3185474656. 19. 3328325750.
20. 2676061874. 21. 4098341772. 22. 1442642432. 23. 250939134.
24. 5068545378. 25. 6893535216. 26. 481300162564.

Exercise XIII.—(Page 34).—1. 28640892. 2. 26519744.
3. 52446360. 4. 31767812. 5. 36963360. 6. 34247200. 7. 54887430.
8. 38880520. 9. 60418118. 10. 60205120. 11. 18564656.
12. 27953254. 13. 20748300. 14. 87745800. 15. 54488700.
16. 620880000. 17. 49146300. 18. 596317800. 19. 58074156280.
20. 100147000000. 21. 24379565760. 22. 73336063500.
23. 491133254481. 24. 565234946856. 25. 247976790000.
26. 454923422100. 27. 720014500072. 28. 102752452800.
29. 60643205616. 30. 5650259200.



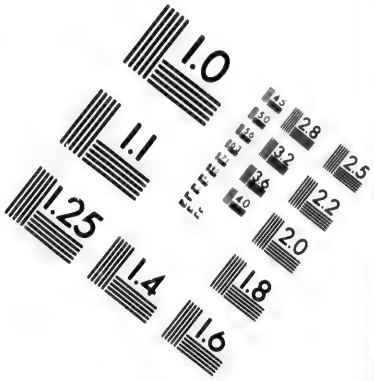
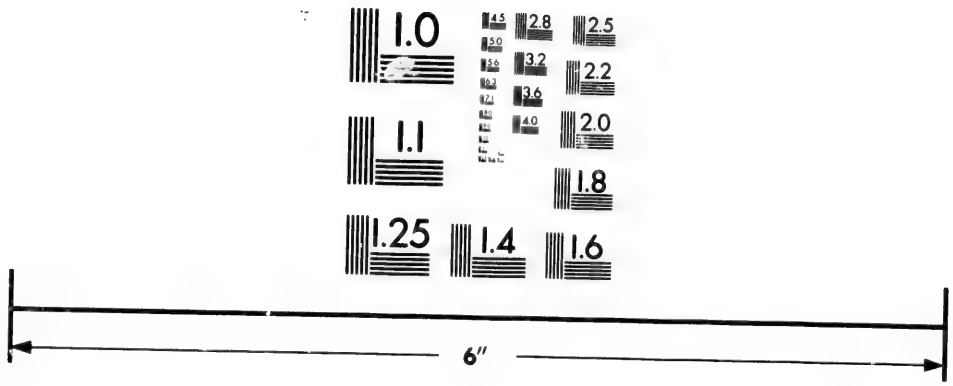
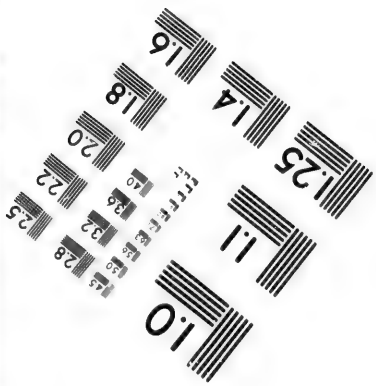
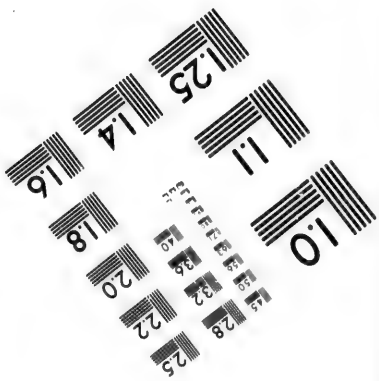


IMAGE EVALUATION TEST TARGET (MT-3)







Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

Exercise XIV.—(Page 35).—1. 312. 2. 510. 3. 2910. 4. 5432. 5. 8640. 6. 3024. 7. 1224. 8. 62640. 9. 76544. 10. 13650. 11. 346875. 12. 429760. 13. 66528. 14. 4992. 15. 56560000. 16. 512000. 17. 57600. 18. 42000. 19. 11022480. 20. 3734368.

Exercise XV.—(Page 35).—1. 20928. 2. 24705. 3. 118144. 4. 130365. 5. 255888. 6. 165732. 7. 531528. 8. 7003296. 9. 6675944. 10. 7229568. 11. 5039694. 12. 6096303. 13. 5321190. 14. 14570640. 15 7776648. 16. 7632922. 17. 5041872. 18. 2342844. 19. 47332176. 20. 85548816.

Exercise XVI.—(Page 36).—1. 759 apples. 2. 2250 yards. 3. 270704 bricks. 4. 49280 yards. 5. 121452 pounds. 6. 10278 feet. 7. 43904 oranges. 8. 1370940 people. 9. 380160 feet. 10. $405. 11 65766 men. 12. $200070. 13. 4644 bushels. 14. 135464 stalks. 15. 260064 checks. 16. 561996 steps. 17. $6080.

Examination Paper No. 1.—(Page 37)—1. Two thousand nine; thirty-one thousand, thirteen; seventy million, six thousand, forty.
2. 13900; 10050004; 19806000. 3. 193444. 4. 5625753. 5. 160 marbles. 6. 144 panes. 7. 1700 cents. 8. 126 miles. 9. $11180. 10. $603.

Exercise XVIII.—(Page 39).—1. 1342. 2. 1613. 3. 2352. 4. 5314. 5. 40425. 6. 20226. 7. 63053. 8. 34353. 9. 361361. 10. 416250. 11. 305240. 12. 506143. 13. 722451. 14. 567104. 15. 452232. 16. 542712. 17. 504717. 18. 401244. 19. 420443. 20. 613315. 21. 222160. 22. 433246. 23. 142314. 24. 206040. 25. 531230. 26. 814064. 27. 711603. 28. 801126. 29. 3403. 30. 707630. 31. 700110. 32. 705300.

Exercise XIX.—(Page 40).—1. 31 bushels. 2. 23 marbles. 3. 31 cents. 4. 142 pounds. 5. 1520 yards. 6. 33 marbles. 7. 153 apples. 8. 33 eggs. 9. 16 marbles. 10. 21 buttons. 11. 133. 12. 3. 13. 162. 14. 2504. 15. 1244. 16. 3272. 17. $5013. 18. 8545. 19. $2065. 20. $4670.

Exercise XX.—(Page 43).—1. 5851. 2. 3665. 3. 4845. 4. 2562. 5. 6036. 6. 5546. 7. 4536. 8. 2557. 9. 3758. 10. 55286. 11. 54545. 12. 12458. 13. 57647. 14. 37857. 15. 25666. 16. 69365. 17. 45048. 18. 27488. 19. 33888. 20. 39934. 21. 8798. 22. 17946. 23. 53528. 24. 469. 25. 297538. 26. 389623. 27. 399042. 28. 624568. 29. 77664. 30. 168995. 31. 77. 32. 72804. 33. 233628. 34. 138247. 35. 97377. 36. 304909. 37. 91078. 38. 347985. 39. 311869. 40. 148760.

Exercise XXI.—(Page 44).—1. 34673. 2. 35914. 3. 57964. 4. 6824. 5. 53431. 6. 59712. 7. 4136. 8. 8727. 9. 24772. 10. 18223. 11. 40996. 12. 59833. 13. 242174. 14. 317673. 15. 207144. 16. 622666. 17. 425235. 18. 170679. 19. 626996. 20. 409264. 21. 317266. 22. 598799. 23. 486826. 24. 77924. 25. 21267. 26. 93192. 27. 34568. 28. 97994. 29. 79998. 30. 469992.

Exercise XXII.—(Page 44).—1. 39 marbles. 2. $302.
3. 749 years. 4. $3925A. 5. $64. 6. 109 sections. 7. 10374.
8. $4. 9. 61413. 10. 85024. 11. $606. 12. $288. 13. Halifax 1812.
14. 4810. 15. 4669.

Exercise XXIII.—(Page 46).—1. 4784. 2. 125. 3. 7041.
4. 28441. 5. 83412. 6. 35217. 7. 2096. 8. 417. 9. 803.
10. 1610. 11. 1. 12. 117782. 13. 37913. 14. 5639. 15. 1018.
16. 46275. 17. 15671054. 18. 8966098. 19. 264115. 20. 19123.

Exercise XXIV. (a).—(Page 47).—1. 163. 2. 6432. 3. 29.
4. 2640. 5. 5015472. 6. 61325. 7. 8483. 8. 665856. 9. 11517.
10. 46. 11. 47. 12. 15. 13. 10392. 14. 4580. 15. 4580. 16. 57.
17. 155. 18. 900. 19. 79291. 20. 76569. 21. 43. 22. 3554.
23. 3467462. 24. 2745887. 25. 921584.

Exercise XXIV. (b).—(Page 48).—1. 5204736082. 2. 4910088.
3. 5698999. 4. 174414. 5. 6552. 6. 39501. 7. 3909632. 8. 31007.
9. 300 and 222. 10. 1032834 and 433058. 11. 75308643. 12. 88450739.

Exercise XXV.—(Page 49).—1. 1785 days. 2. 1376 men.
3. $429. 4. $30. 5. $1912. 6. $1254. 7. 30199. 8 $56. 9. $222.
10. $1855. 11. $158. 12. 144 days. 13. 816 days. 14. Gain $81.
15. 876204 letters. 16. $1200. 17. Lost $228. 18. 221 miles.
19. 975 miles. 20. $2.84.

Examination Paper No. 2.—(Page 51).—1. 58567.
2. 665007241128. 3. 998998. 4. 51. 5. 69825. 6. Ninety-six, four.
7. 1112 yards. 8. 240647202. 9. 162008. 10. Gain $19.

Exercise XXVII.—(Page 55).—1. 2413. 2. 1203. 3. 1788.
4. 1435. 5. 25696. 6. 24536. 7. 24325. 8. 13436. 9. 24752.
10. 153237. 11. 298071. 12. 142543. 13. 208145. 14. 142786.
15. 194383. 16. 123228. 17. 144322. 18. 192978. 19. 33618.
20. $42247\frac{1}{4}$. 21. 141612. 22. 167863. 23. 122423. 24. 25241.
25. 122334. 26. $34355\frac{1}{8}$. 27. 23142. 28. $14252\frac{2}{5}$. 29. $32257\frac{1}{8}$.
30. $51592\frac{1}{5}$. 31. $145484\frac{1}{6}$. 32. 63673. 33. $51452\frac{2}{6}$. 34. $124868\frac{1}{4}$.
35. $25691\frac{8}{10}$. 36. $14224\frac{8}{11}$. 37. 33141. 38. 67517. 39. $63741\frac{4}{12}$.
40. $69743\frac{8}{12}$.

Exercise XXVIII.—(Page 56).—1. 32421. 2. 416226. 3. 273819.
4. 371926. 5. 312114. 6. 236821. 7. 377188. 8. $228394\frac{1}{4}$.
9. $253541\frac{1}{2}$. 10. 152263. 11. $241875\frac{1}{3}$. 12. 329218. 13. 212133.
14. 162144. 15. $145143\frac{3}{4}$. 16. 256436. 17. 168186. 18. $228977\frac{3}{4}$.
19. 121424. 20. 142453. 21. $258268\frac{3}{5}$. 22. $153564\frac{1}{5}$. 23. 121413.
24. 141612. 25. 151424. 26. $145142\frac{3}{4}$. 27. $196588\frac{3}{4}$. 28. $187966\frac{1}{8}$.
29. $17125\frac{1}{4}$. 30. 121412. 31. $142442\frac{1}{4}$. 32. $23860\frac{1}{4}$. 33. $34522\frac{1}{4}$.
34. 22323. 35. 32325. 36. $54245\frac{1}{4}$. 37. 23242. 38. 32344.
39. $22314\frac{9}{11}$. 40. 31335. 41. $52043\frac{7}{11}$. 42. $63206\frac{7}{12}$. 43. $85275\frac{1}{11}$.
44. $82998\frac{1}{12}$.

Exercise XXIX.—(Page 56).—1. 3806281/2. 2. 487655. 3. 140805. 4. 1905091/3. 5. 1406843/4. 6. 1990852/4. 7. 1508731/8. 8. 1590051/5. 9. 116029. 10. 159908. 11. 1849671/4. 12. 469293/8. 13. 1200531/7. 14. 40534 2/7. 15. 1286091/7. 16. 8267522/6. 17. 66045. 18. 1768994/5. 19. 122063. 20. 32004. 21. 1240005/8. 22. 725455/7. 23. 6900578. 24. 1259508/8. 25. 1030404/5. 26. 42014. 27. 178759 3/4. 28. 4303332/5. 29. 1898464/7. 30. 1000032/8. 31. 116006/9. 32. 8480232/7. 33. 987653/5. 34. 9721242/8. 35. 95238. 36. 889696/8. 37. 48070 8/11. 38. 42254 6/12. 39. 583441 1/2. 40. 79299.

Exercise XXX.—(Page 57).—1. 31 stamps. 2. 205 barrels. 3. $1269. 4. 1760 yards. 5. 867 bills. 6. 3570 pecks. 7. 2884 barrels. 8. 1252 bags. 9. 49 half dozens. 10. 11429 boxes. 11. 6908 houses. 12. 1440 minutes. 13. 855 tents. 14. 7682. 15. 1536 times. 16. 85129 6/8 square yards. 17. 378 8/12 dozens.

Exercise XXXI.—(Page 59).—1. 2715 2. 2719. 3. 8309. 4. 8374 15/27. 5. 6804. 6 9876. 7. 8917 14/63. 8. 9008 57/64. 9. 7938 67/84. 10. 1234. 11. 2234 88/125. 12. 3917 59/144. 13. 4436 60/288. 14. 5612 66/180. 15. 1298 244/576. 16. 11833 207/735.

Exercise XXXII.—(Page 60).—1. 872 69/100. 2. 783 700/1000. 3. 37581 4/20. 4. 30929. 5. 7173 30/40. 6. 15421 3/5. 7. 16547 8/80. 8. 7785 1/10. 9. 3653 84/200. 10. 1145 41/800. 11. 198 49/700. 12. 740 900/900. 13. 1533 906/6000. 14. 8212 101/110. 15. 5974 52/120. 16. 542 672/1100. 17. 7643 1008/1200. 18. 330 900/2000.

Exercise XXXIII.—(Page 62).—1. 1234. 2. 1342. 3. 1335 8/24. 4. 5416 5/21. 5. 2121 2/34. 6. 3142. 7. 2311 1/36. 8. 13151 5/45. 9. 24130 7/45. 10. 21342. 11. 1324 3/54. 12. 2314 3/42. 13. 13461 36/50. 14. 312164 8/44. 15. 2345 2/85. 16. 4116 8/65. 17. 2415 2/47. 18. 141 30/74. 19. 3254 8/88. 20 2125 5/85. 21. 2536 1/54. 22. 3165 3/65. 23. 2824 5/65. 24. 4830 3/65. 25. 4613 7/39. 26. 3264. 27. 4632 4/84. 28. 2635 4/78. 29. 1324. 30. 2423 5/97. 31. 6204 8/35. 32. 5042. 33. 2506 1/94. 34. 6052. 35. 2006 1/96. 36. 30853 4/49.

Exercise XXXIV.—(Page 62).—1. 3412 87/125. 2. 1563 15/241. 3. 2406 111/302. 4. 5112 2/275. 5. 2671 119/329. 6. 4718 200/486. 7. 4567 8/278. 8. 5678 100/506. 9. 6789. 10. 5938 51/746. 11. 8947 120/612. 12. 9786 6/832. 13. 3092 231/323. 14. 8009. 15. 2708 112/585. 16. 7820 158/307. 17. 4083 12/607. 18. 7389 74/709. 19. 4136 23/65. 20. 8989. 21. 7394 277/1215. 22. 4273 238/385. 23. 8788 103/908. 24. 7638 313/8007. 25. 6925 50/884. 26. 1309 111/918. 27. 8007 313/7638. 28. 3963 29/804. 29. 5939 58/84. 30. 7019 18/94. 31. 40930 274/770. 32. 37185 496/576. 33. 93501 100/806. 34. 57499 1209/8876. 35. 6083 2005/10063. 36. 52631 1/2346 87.

Exercise XXXV.—(Page 63).—1. 14 cents each. 2. 408 oranges each. 3. 53 days. 4. 416 8/12 feet. 5. 917 years. 6. 86 years. 7. 36 miles. 8. 706 horses. 9. 3916 barrels* 10. 2097 boxes. 11. 72 farms. 12. 1082 cords. 13. $136 8/10. 14. 200 acres. 15. 156 provinces and 16506 square miles over.

*One of the barrels will not be quite full.

Exercise XXXVI.—(Page 65).—1. 25. 2. 340$\frac{4}{11}$. 3. 106. 4. 5681. 5. 27342. 6. 87. 7. 64. 8. 64. 9. 4. 10. 20000. 11. 714. 12. 7$\frac{1}{2}$004.

Exercise XXXVII.—(Page 66).—1. 100. 2. 3. 3. 5. 4. 12. 5. 2376. 6. 40. 7. 216. 8. 3. 9. 2. 10. 60. 11. 31. 12. 66. 13. 9. 14. 27. 15. 591. 16. 550. 17. 36. 18. 1536. 19. 2200. 20. 1492992.

Exercise XXXVIII.—(Page 66).—1. 1612. 2. 32776. 3. 1636. 4. 2940. 5. 30. 6. 319. 7. 195. 8. 29. 9. 62154. 10. 178. 11. 93. 12. $143. 13. 87. 14. 1139. 15. 22823. 16. 47183. 17. 84345856. 18. 23. 19. 472356. 20. 8064.

Examination Paper No. 3.—(Page 68).—1. 322092 inches. 2. 1945 yards. 3. 8294 pounds. 4. 4$\frac{2}{3}\frac{1}{5}\frac{5}{7}$. 5. 96. 6. 211. 7. $3.00. 8. $30.00. 10. 1186812 ; 407.

Exercise XXXIX.—(Page 69).—1. 38. 2. 11$\frac{3}{4}$. 3. 39. 4. 41 5. 406. 6. 60$\frac{3}{4}$. 7. 522$\frac{5}{7}$. 8. 63$\frac{2}{5}$. 9. 79. 10. 133$\frac{1}{5}$.

Exercise XL.—(Page 71).—1. 4, 7, 9, 28. 2. 18, 39, 40, 56. 3. 51, 67, 90, 93. 4. 666, 330, 440. 5. 1666, 2504, 849. 6. II., III., IV., VIII., IX. 7. XIII., XV., XX., XXII., XXV. 8. XIV., XVI., XXIV., XXIX., XXX. 9. XLIV., LV., LXVI., LXXVII., LXXXVIII., XCIX., C., CXXVII. 10. CCLI., CDLXXXVI., DXX., DCXIV., DCCCXCII., MDCCC-XCIV., $\overline{X}$., $\overline{C}$.

Exercise XLII.—(Page 72.)—1. $30.45. 2. $2583.59. 3. 2502.01. 4. $17175.60. 5. $28128.52. 6. $234271.12. 7. $23.40. 8. 29.88. 9. $9.32. 10. $287.60.

Exercise XLIII.—(Page 73).—1. $6458. 2. $6751.80. 3. $13037.52. 4. $25217.35. 5. $520767.80. 6. $776824.50. 7. $2355941.68. 8. $5483850.14. 9. $8656623.60. 10. $71570025.17. 11. $10.62. 12. $8.28. 13. $66.96. 14. $169.42. 15. $2212.60. 16. $778.75. 17. $15.91. 18. $190.08. 19. $969.80. 20. $829.45.

Exercise XLIV.—(Page 74).—1. $47.75. 2. $11.76. 3. $893.05. 4. $133.96. 5. $1288.28. 6. $72345.96. 7. $900.55. 8. $1911.46. 9. $261.65. 10. $240.53.

Exercise XLV.—(Page 75).—1. $64.07. 2. $133.35. 3. 391.86\frac{4}{7}$. 4. $1513.03+. 5. $874. 6. $85 32. 7. $235.67. 8. $13.90. 9. 1383.59\frac{3}{8}$. 10. $9085.39+. 11. 54 pounds. 12. 17 chairs.

Exercise XLVI.—(Page 76).—1. $69.60. 2. 3 pounds. 3. $88.39. 4. $42.30. 5. Gain $26.88. 6. $9.02 still owing. 7. $18.35. 8. $4.13. 9. Gain $94. 10. 71 barrels. 11. 25 cents. 12. $24. 13. 110 pounds, 32 cents. 14. $30.45. 15. $384.39.

Examination Paper No. 4.—(Page 77).—1. 4660. 2. 42 pounds. 3. 4375. 4. MCCXLVI. 5. $210850.92. 6. 62$\frac{8}{15}$ pounds. 7. $864.45. 8. 4788 trees. 9. 691$\frac{2}{3}\frac{3}{6}$ hours. 10. $76.20.

Exercise XLVII.—(Page 80).—**1.** $15.75. **2.** $6.04. **3.** $27.02. **4.** $13.65. **5.** $34.97. **6.** $306.49. **7.** $6.01. **8.** $369.05. **9.** $8.86. **10.** $8 84 balance.

Exercise XLVIII.—(Page 82).—**1.** $0.55. **2.** $0.39. **3.** $0.25. **4.** $0.36. **5.** $2.24. **6.** $50.85. **7.** $76.05. **8.** $2816.00. **9.** $375. **10.** 150 bushels. **11.** 7200 seconds. **12.** 86 minutes. **13.** $0.95. **14.** 1011 minutes. **15.** 500 miles. **16.** $23.10. **17.** $48.10. **18.** $27.30. **19.** $582.25. **20.** $32.34.

Exercise XLIX.—(Page 84).—**1.** 6 boys. **2.** 21 girls. **3.** 27 horses. **4.** 33 men. **5.** 13 men. **6.** 3 days. **7.** 48 days. **8.** 48 days. **9** 133 days. **10.** 22 days. **11.** 15 printers. **12.** 48 looms. **13.** 11 days. **14.** 20 days. **15.** $6.29. **16.** $135.45. **17.** 24 men. **18.** 27 days. **19.** 0.55\frac{5}{12}$. **20.** 10 days.

Exercise L.—(Page 85).—**1** 19 yards. **2.** 24 men. **3.** 235 pounds. **4** 21 pecks. **5.** 30 cans. **6.** $3.51. **7.** 93 acres. **8.** 100 acres. **9.** 10 yards. **10.** 6 yards. **11.** 7 pounds. **12.** 44 pounds. **13.** 186 miles. **14.** $143 52. **15.** $1.60. **16.** 45 days. **17.** 240 men. **18.** 7 tons. **19.** 17 men. **20.** 97 barrels.

Examination Paper No. 5.—(Page 86).—**1.** 186924. **2.** $1388\frac{3065}{4084}$. **3.** 76. **4.** 57. **5.** $12.96. **6.** $19494. **7.** 4704. **8.** $143.85. **9.** 200. **10.** $12.90.

Examination Paper No. 6.—(Page 87).—**1.** 1296366360. **2.** $600009\frac{9585}{9678}$. **3.** 999907. **4.** $16.02. **5.** 4350 apples. **6.** $54.96. **7.** $5.75 amount. 0.57\frac{1}{2}$ average. **8.** $22.31. **9.** 55 pairs. **10.** 100, 100, 200.

.02.
86.

5.
75.

.30.

5.

es.

6.